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Contents

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Removal of Sulphur Compounds by Hydrolysis

WE publish in this issue a remarkably interesting communication from Dr. E. K. Rideal, which forms a reply to—partly, in fact, a criticism of—the comments we made in our issue of August 22 in connection with the process for removing sulphur from gases that has recently been patented by Professor J. W. Cobb and Mr. H. J. Hodsman, of Leeds University. Some of our readers may recall that in singling out this process for notice we explained that we did so in view of the very considerable economies that it would, if really perfected on a technical scale, introduce in the rationale of towns' gas production, but care was taken to draw attention to the preceding work, on very similar lines, that had been carried out in this country by Professor H. S. Taylor and Dr. Rideal. It is just possible that the title—"Professor Cobb's New Process"—under which our comments appeared may have led to the misimpression that we considered the specification to disclose some revolutionary reaction; rather, however, was it in our mind that the interest of the whole matter lay in the association of the names of Professor Cobb and his colleague with it.

Since the publication of our original remarks we have had the advantage of a discussion of the process with a technical chemist who was for some time associated with Professor Taylor and Dr. Rideal at a time when they were conducting experiments at a large works for the Munitions Inventions Department. Our informant tells us that he was so impressed with the possibilities of the principles involved that he continued to carry out experiments with the process on a comparatively large scale after the closing down of the Munitions Inventions Department had deprived him of his association with Drs. Taylor and Rideal.

The experience of these trials was of considerable value in indicating that while the desired reactions would proceed for a time, secondary influences eventually intervened, with the result that the process assumed a measure of uncertainty which seemed to preclude its employment on an industrial scale. It seemed to come down, in fact, to another of those many instances in which, for some reason or other, it is not possible to translate entirely the encouraging results of the laboratory to a works process. It is not necessary for us to deal here with the disturbing influences which intervene, for Dr. Rideal explains these fully elsewhere. The main point in question is as to the extent to which Professor Cobb and Mr. Hodsman have carried their investigations and as to the means they employ for overcoming the difficulties which arise in practice. Moreover, the patent specification to which we referred does not seem to indicate whether the process is the outcome of laboratory or large-scale experiments, and it would be of immense value if the patentees would satisfy those who are interested on this point as well as on the other points raised by Dr. Rideal.

"Science and Plain English"

A RECENT article by Sir Oliver Lodge in the *Observer* on the art of writing about science in plain English reminds Dr. Percy Spielmann, as we learn from a contribution to the same journal, of what is frequently charged against the scientific man, namely, the incapacity to express himself clearly and in even passable English. Although Dr. Spielmann admits this charge to be somewhat too sweeping, he adheres to the view that a scientific man "seldom writes English that is a pleasure to read for its own sake and apart from its subject." The exceptions are probably rather more numerous than is allowed for here. One example of the complete mastery of the most flexible and yet most exact English often attained by scientists of the highest standing is to be found in this issue in the contribution from Dr. M. O. Forster of Bangalore.

Frequently, too, of late it has been remarked that our newer schools of research in dyestuffs and other fields have produced men no less distinguished for their gift of literary exposition than for the high level of their science.

The scientific writer, we are told, has three audiences —his fellow scientists, the educated and imaginative section of the general public, and those less well endowed with these mental developments. It is the difficulty of catering for the third class that mainly troubles Dr. Spielmann and others. He looks for relief first of all to the trained journalist, because his general success depends on his displaying matter in a form assimilable by the untrained mind. But on the whole the verdict is that as a serious expositor of science the journalist may do even more harm than good, because he peptonises the indigestible diet with a mischievous flippancy, and for the present, it is suggested, serious contact between scientists and the public must be made by the scientists themselves. Some of these, such as Sir William Bragg and Sir Oliver Lodge, have already demonstrated their power of describing scientific subjects in a style that is both popular and sound. The only difficulty, as Dr. Spielmann recognises, is that researchers of this class are too valuable to be spared for the work of popular exposition, except at rare intervals, and he is thus driven back to the former conclusion that it ultimately devolves upon the journalist to introduce new knowledge to the general public. Even this, however, is not accepted as at all satisfactory, and the editorial artist is sternly warned that he must write " with a responsible sense of the nation's advantage and not make his contribution a means of extracting a mediocre but murderous fun from his subject." Meanwhile, some of our more responsible dailies are solving the problem of interpreting science to the public in another way which involves no dependence on flippancy or any other form of quackery. Examples of the method may be found in the admirable scientific articles which have been appearing for some time in the *Glasgow Herald*, and in such contributions as that which Professor Nash contributed the other day to the *Birmingham Post* on the newer methods for the chemical treatment of coal.

Ludwig Mond

It was a true description of his father that Sir Alfred Mond gave at the unveiling of the statue of Dr. Ludwig Mond at Clydach on Saturday, when he referred to the achievements of " one of the greatest figures in the industrial science of his generation," and appealed to those who were to carry on his work in the future to live by his motto, " Make yourself necessary." When the public hear the name of Mond and that of his partner Brunner, it is natural perhaps that they should think of them primarily as the representatives of great commercial prosperity. But with Dr. Ludwig Mond the material prosperity was a by-product of something much greater. He was in all his instincts a scientist, whose mission was to wrest from nature new knowledge for the service of mankind, and whose satisfaction lay essentially in the triumphs of discovery and their applications rather than in the material profits that followed in their train. Had he been concerned only with the gains to himself he would never have accomplished the great work he did ; it was his unquenchable love of knowledge and his belief in its power from which he drew the inspiration to attempt so much and which sustained his faith through all his great enterprises. His high conception of service may well be recalled in these days, when purely material aims so largely dominate the two extreme parties in the industrial world. Only out of such service can any real progress come, and only in the spirit of such service can the true citizen—whether scientist, organiser, administrator, or humble craftsman—find the satisfactions of a real vocation. Among the workers of Clydach Vale, of all ranks, the figure of Dr. Ludwig Mond will long stand as an example and an inspiration.

High-Grade Sodium Sulphide

Within recent years sodium sulphide has established itself as an essential commodity in a number of the more important branches of chemical industry, by no means the least notable of its applications being in connection with the production of sulphur dyes and the denitrating of artificial silk. At the present time the market value of the crystals is in the neighbourhood of £9 10s. per ton, but if the promise shown by a new electric furnace process that is now being developed is fulfilled there would seem to be every likelihood of producing the sulphide more cheaply and of much greater purity than that made by the more common process. Sodium sulphide is commonly manufactured by heating sodium sulphate with coke in a reverberatory or a rotary fuel-fired furnace at a temperature low enough to prevent rapid fluxing of the refractories. The low temperatures give low yields and slow production, and high temperatures give rapid production and destruction of the furnace, so that the manufacturer is between two fires, particularly as pyrometers or temperature measuring devices cannot be economically used in the process. At the moderate temperatures used, the charge goes solid at a certain stage, and it is this process of solidification that leads to complications and precludes a high-grade product from being obtained. It is found, in fact, that so soon as the product of reduction contains, at temperatures above 1,000° C., 65 per cent. of sodium sulphide the solidification process suddenly asserts itself, a peculiarity which is due to the infusibility of the substance when approaching the higher stages of purity.

It has, accordingly, been recognised for some time that, if a high-grade sodium sulphide is to be produced direct from the furnace, means must be found to flux the sulphide at high temperatures. A number of substances will do this, but in nearly all cases their use is followed by some undesirable effect on the final quality of the product. In Canada, however, Mr. Horace Freeman, in conjunction with the Canada Carbide Co., of Shawinigan, has lately introduced a process in which reduction is effected in the electric furnace, potassium sulphide being utilised as a fluxing medium. Manufacture on these lines is now being carried out on a large scale, and it is found that the charge remains entirely liquid at all stages, the necessary condition of the carbon particles in the mobile liquid permitting of complete reduction of the sulphate. Certain plant difficulties were, as might be expected,

found to arise; but, by dispensing altogether with refractories and using a water-cooled furnace shell, these have been successfully overcome, and a remarkably pure sulphide, averaging from 90 to 95 per cent., is now being put on the market. The introduction of the process is certainly an important achievement, and there can be little question that with a high-grade anhydrous sulphide now available new applications will be found. Even improvements in manufacture such as this bring their embarrassments, however, for the producers state that so many consumers have dropped into the habit of utilising the usual 60 per cent. variety that their demands for the lower grade sulphide have had to be met in some instances by diluting down the new high-grade substance.

The Importance of Technical Literature

At the present time it is more important than ever that those engaged in the chemical industry both on the research and on the commercial sides should keep themselves informed of all the latest developments in the science which succeed one another so rapidly. A recognised part of the equipment of every research institution is a library of technical books, and leading chemical concerns are realising more and more the importance of having the latest information readily available for their technical staff. It is not only necessary to be in touch with all the books that are published in any particular sphere, but works referring to chemical matters generally must be available. It would probably be impossible for any but the largest firms to take in all the volumes issued on chemical technology, and it is in this connection that the weekly newspaper performs one of its many essential functions for the chemical industry.

In this issue we reproduce an interesting article from the latest book on the *Industrial Applications of Coal Tar Products*, which gives a general indication of the very wide field influenced by this important class of substances. It is to be feared that book reviews often become essays in which the writer airs his own particular views, but the purpose of such notices should be to indicate the character of the work under consideration, so that the chemist may know whether or not it will be of service to him in his special field. By following the book reviews, which from time to time appear in these columns, a survey of important publications is obtained, which it is our endeavour should enable the chemist to keep in touch with everything of importance which is written.

Much of the matter, however, which eventually finds its way into books is published beforehand in technical journals, and on this point especial attention may be drawn to our references to current literature, a feature which is widely appreciated and week by week covers virtually the whole field of chemical publications both at home and abroad. In this connection the weekly news, which constitutes the basic matter of the trade paper, may be made of even greater service to the chemist by the use of a systematic filing of its contents to meet the individual case. Every research worker finds it necessary at some time or another to refer to special articles in back numbers, and in these cases the index is useful. When, however, he is primarily interested in a special subject, a system of news-cutting proves more helpful. He wants, for instance, to get together all the information which has appeared on a particular point. It is a tedious business to go through every volume to find the material he requires, but if a few minutes be spared each week to cut out and file the items of special interest, a valuable record of technical matters may be obtained which will form an indispensable part of the library equipment of every chemist and chemical concern.

Industry Fairs

We learn from an official announcement that appears on another page that the British Industry Fair, which for the past two years has been overshadowed by the Empire Exhibition at Wembley, is to be revived in February next on its former scale. It will be held simultaneously in London and Birmingham during the period February 15 to 26. The chemistry exhibits, it is understood, will again be shown in London, and although no official intimation on the subject has reached us, it may be assumed that the arrangements will again be in the competent hands of the Association of British Chemical Manufacturers. At the Leipzig Fair, which ended last week, the German chemical exhibits were not regarded as a great success.

Points from Our News Pages

A comprehensive survey of the numerous industrial applications of coal tar products is included in an important work by H. M. Bunbury and A. Davidson (p. 296).

A special report of the unveiling of the statue of the late Dr. Ludwig Mond, at the 25th anniversary celebrations of the Mond Nickel Co. at Clydach. A photograph of the statue appears (p. 299).

Dr. M. O. Forster, of Bangalore, contributes a reply to the recent correspondence in The Chemical Age on "Benzene and the Colleges" (p. 301). Dr. E. K. Rideal gives further facts on Professor Cobb's process (p. 300).

The Chemical Trade figures show decreases in imports and exports both in comparison with the previous month and with last year, but the effects of the holiday season detract from the significance of the figures as an accurate indication of trade (p. 302).

The London chemical market is rather brighter, prices are maintained, but export is featureless. Coal tar products appear scarcer owing to reduced production (p. 308).

Heavy chemicals are moderate in the Scottish market. Inquiry is better, prices level (p. 311).

Books Received

Transactions of the Institution of Chemical Engineers. Vol. 2. 1924. London: The Institution of Chemical Engineers. Pp. 110.

Principles and Practice of Industrial Distillation. By E. Hausbrand and E. Howard Tripp. London: Chapman and Hall, Ltd. Pp. 300. 21s.

Chemicals and Allied Products in Canada. 1923. By the Dominion Bureau of Statistics. Ottawa: F. A. Acland. Pp. 50.

The Industrial Applications of Coal Tar Products. By H. M. Bunbury and A. Davidson. London: Ernest Benn, Ltd. Pp. 284. 42s.

The Calendar

Oct. 4	Société de Chimie Industrielle: Fifth Annual Congress.	Paris.
Oct. 23	Engineers' Club: Annual Dinner.	Savoy Hotel, London.
Nov. 13	Chemical Industry Club. Annual Dinner.	London.

Industrial Applications of Coal Tar Products

By H. M. Bunbury and A. Davidson

By permission of the publishers, Ernest Benn, Ltd., we are able to reproduce below the introduction to an important new volume, just published at 42s., on "The Industrial Applications of Coal Tar Products," by H. M. Bunbury, M.Sc., A.I.C., and A. Davidson, A.I.C., F.C.S.

Coal Tar as a Raw Material

As a raw material of the chemical industry coal tar ranks second to none in importance. At one time a waste product, a veritable nuisance and embarrassment to the coal gas industry, every pound of it produced at the present time is turned to some useful purpose: no portion of it is wasted. The extraordinary progress of the organic chemical industry during the last twenty or thirty years is due in a very large degree to the development of the utilisation of the constituents of coal tar. One after the other these constituents have increased in value and importance as fresh applications have been found for them. At the present time benzene, toluene, naphthalene, and phenol are isolated in the pure state, and anthracene in a partially purified state, and these form the starting-points of a vast number of products, an already comprehensive list which is being increased and extended in both number and variety almost daily. The majority of the industrially important organic chemicals are prepared from these five starting materials. The xylenes and cresols, phenanthrene, acenaphthene and carbazole are also available, but their application and that of their derivatives is much more restricted. Of the other constituents, such as pyridine and its homologues, isoquinoline, acridine, indole, diphenylene oxide, fluorene, and the higher benzene homologues, methods for their isolation from coal tar have been devised. With the exception of indole and isoquinoline, whose separation has been put on a commercial basis, and possibly fluorine, the technical importance of these compounds is almost negligible. A number of other important compounds occur in coal tar, such as, for example, aniline, quinoline, the naphthols, and acetophenone, but they are not derived from that source in actual practice, being more readily obtained by cheaper and less troublesome synthetic methods—from other primary coal tar constituents, be it noted.

From an industrial and commercial point of view as distinct from that of the organic chemical industry itself, the various crude products obtained from coal tar are of prime importance. These crude products form various "fractions" of coal tar, that is to say, they are the fractions obtained by the distillation of the tar, together with certain residues from this operation. The chief of these are the benzols, toluols, solvent naphtha, cresylic acid, creosote, anthracene oil, and pitch. All these are used extensively in a large number of industries. The tendency at the present day is for the further utilisation of the single constituents of the tar, the problems connected with which open up a vast field for research, only a small part of which has so far been explored.

The Dependent Industries

Let us glance for a moment at the many and various industries and trades which are involved in the production and utilisation of coal tar and its products. First of all, there are the coal gas and coke oven concerns. These are the producers of the raw tar. The tars obtained by these two processes are not quite identical in composition, but are sufficiently nearly so for them to be classed together as "coal tar." We must not forget, also, that a certain amount of commercially important tar is produced by coke-fed blast furnaces, producers, and water gas, but we shall not consider these here. In both gas works and coke oven works the tar is a by-product. Nevertheless, its commercial value is so great to-day that the financial and economic success of these undertakings depends in no small measure on the state of the coal tar market. The ever-increasing demands for both crude and pure products brought another industry into being—namely, that of tar distillation. The separate crude products and some of the pure ones are now mainly marketed by the tar distillers, but there has been a growing tendency of late years for the gas and coke oven companies to work up their own tars. Some of them have gone even further and are manufacturing pure chemicals of various descriptions from the tar fractions. The production and distillation of coal tar constitute one of the most important branches of chemical industry and one of vital national importance. This field of chemical manufacture, which may be termed the coal tar industry proper, supplies certain crude materials which are utilised as such in enormous quantities. We may refer here to three ways in which these are applied industrially. In two of these separate industries are concerned.

Fuels, Road Tars and Solvents

The first of these is the fuel industry. In its various branches it utilises large quantities of coal tar products, of which particular mention may be made of benzol for motor fuels and pitch for the manufacture of briquettes. These constitute two of the chief outlets for benzol and pitch. Incidentally, the manufacture of coal briquettes involves those engaged in the coal trade. Creosote and other heavy oil fractions were extensively employed during the late war as fuels for certain types of oil engines, such as those of the Diesel type: it is estimated that about three-quarters of a million tons were used as fuel by the Admiralty alone. Crude naphthalene has long been a favourite fuel for incorporation in fire lighters, and also finds some employment in internal combustion engines; and the lighter fractions of the tar, such as crude benzols and naphtha, are employed to some extent in heating-lamps.

The second extensive use for a crude product is that of the "prepared" tars for road-making. The amount of tar employed for this purpose at the present time is so great as seriously to threaten the existence of the briquette industry. When it is remembered that about half the weight of tar subjected to distillation remains behind in the still as pitch, it will be realised what a tremendous factor in the economic success of tar distillation an extensive outlet for the pitch must be.

The other manner of utilisation of crude tar products consists in their application as solvents. Unlike the two cases just mentioned, this use is not the concern of one or two specialised industries. The many industries employing crude benzenes, toluenes, xylenes, and pyridines are too numerous to mention individually. The many branches of the organic chemical industry utilise enormous quantities, and other large users are the paint and varnish trades and rubber manufacturers. There is a host of smaller users, among whom may be mentioned the manufacturers of various detergents and degreasing compositions and artificial leather, dry cleaners, and so on. A passing mention may be made of the use of the cresols as absorbents in the recovery of volatile solvents as in the Bregeat process, and of heavy tar oils which are used in a similar manner in stripping coal gas of benzene and toluene.

Although the principal industries concerned in the use of coal tar crudes are those we have just mentioned, there are many other minor ones. For example, large quantities of creosote are employed as timber preservative, particularly by the railway companies for preserving sleepers. The makers of artificial resins employ solvent naphtha for the production of cumarone resin, now made in fairly large quantities. The various kinds of pitch are used for such purposes as the manufacture of roofing felts, black varnishes, waterproof, and other types of resistant paints, converter linings in steel manufacture, and the production of pitch coke. The number and diversity of industries dependent to a greater or less degree on the crude coal tar products will thus be readily appreciated. Let us now consider those industries which employ the single pure constituents of the raw tar.

Dyestuffs

The foremost in importance, both from the point of view of the quantity of material utilised and of the number of other industries dependent upon it, is the dyestuffs industry. Very nearly all the manufactured articles one meets with in ordinary daily life contain dyestuffs as part of their make-up. It is impossible to classify all the trades with any degree of accuracy,

but a rough division may be made into those trades which use dyestuffs as such—i.e., the dyeing and calico printing industry, and those which employ dyes in the form of lakes or pigments—namely, again speaking very broadly, the paint and varnish trade. The textile dyers and the lake makers are the principal customers of the dyestuffs manufacturers. To the former belong all those who practise the dyer's art, including the dyers of cotton, wool, silk, artificial silk, fur, leather, straw, etc. This vast industry depends for its very existence on coal tar. The production of pigments and lakes gives rise to a separate and independent industry—a very important branch of the general dyestuffs trade—through whose processes the dyestuffs pass before being finally delivered to the users. These latter comprise practically the whole of the paint and varnish trade, the painters and decorators of all descriptions; the letterpress printing and lithographic trades; the manufacturers of wallpapers, linoleum, and distempers; the makers of rubber, celluloid, lacquers, films and other plastics; soaps, perfumes, powders, grease-paints, lotions and toilet articles generally; foodstuffs, such as sweets and beverages; wax articles; inks, and a host of others, all employ dyestuffs, amounting in the aggregate to very appreciable quantities. Other uses to which dyestuffs are put which involve the use of only small quantities, but which are none the less of considerable importance, are, for example, the preparation of sensitisers, desensitisers, and light filters in photography; microscopic stains; and indicators. No better example than that of dyestuffs could be found to illustrate the value of coal tar as a national asset. Quite apart from any other considerations a large proportion of our working population depend to a greater or less extent on coal tar dyes for their livelihoods.

Drugs and Antiseptics

Although we would not attempt to assess the various degrees of importance to be given to the uses of coal tar products, there is one which must always take its place in the front rank, not, indeed, because of the amount of material involved, which is comparatively small, but on account of its significance in human affairs. We refer to the prevention and suppression of disease, whether in man, animal, or plant. A large number of the specific cures and preventives employed in the various branches of medicine are derived from coal tar, benzene, toluene, and phenol being the chief sources. The products are to be found in many categories, including antiseptics, antipyretics, analgesics, hypnotics, narcotics, insecticides, and so on. The rapid progress of synthetic organic chemistry and the development of chemotherapy have resulted in placing in the hands of the medical profession new and potent lethal weapons wherewith to fight a winning battle against the devastating attack of bacteria and trypanosomes. Powerful bactericides and trypanocides are now available, and with their aid even such deadly diseases as syphilis and sleeping sickness are no longer regarded as incurable. In this connection we may mention the rapid advances which have been made in recent years in the application of dyestuffs as antiseptics. A number of these whose primary use is in the dyeing of textiles have been found to be powerful trypanocides, and there is every reason to hope and believe that a further alleviation of human suffering will be brought about in the near future as a result of their further application in this direction. We may also allude here to the use of such products as phenol, benzoic acid, cresols, naphthalene, and a number of their derivatives as preservatives and as constituents of sanitary preparations and general disinfectants.

The universality in the application of these products is very evident. The chief people concerned in their production are the manufacturing chemists and those companies which confine themselves to the production of certain specialised commodities. It would be drawing a bow at a venture to state that any others depend to any great extent for their livings on these products. Their significance lies, as we have already pointed out, in a direction other than economic.

Perfumery

Another important industry in which coal tar products are being used in ever-increasing quantities is that of the manufacture of perfumes and flavouring materials. At one time the products were supplied almost entirely by nature. It is true that large quantities are still obtained from natural sources, but the synthetic products are coming more and more into use. Many of the compounds formerly extracted from the plant are now manufactured from other raw materials, and, in addition, suitable substitutes for the natural substances have been successfully produced. The call on the natural products will doubtless be still further curtailed in the future. In this connection we may instance the many attempts that are being made to manufacture vanillin. Already a fair measure of success has been attained, and we may look forward to the time when the vanilla bean or clove oil is no longer employed as a raw material. The perfumery industry and its allied branches is to-day a considerable and flourishing one, and when we consider that not only scents and perfumes as such, but also soaps, cosmetics, dentifrices, depilatories, and toilet articles of every description, sweets and confectionery, involve the use of perfumes, to say nothing of the manufacture of saccharin, it will be realised into what a large number of channels these products are diverted and what an appreciable section of our national industries is more or less interested in their manufacture and use.

Explosives

The explosives industry is peculiar in that it attains its maximum activity in time of war, as a consequence of which the aspects of the industry are quite altered. We may illustrate this by mentioning that the production of picric acid and T.N.T. in this country during the late war amounted to more than three hundred thousand tons, whereas in peace time the production is almost negligible. Nevertheless, even in times of peace, the manufacture of explosives is quite a considerable one, the products being consumed for civil engineering, mining, and sporting purposes. These outlets do not, as a matter of fact, involve the use of much explosive made from coal tar products, since the aromatic nitro-compounds are employed for these purposes only in restricted amounts. Whilst on the subject of war-time products we may mention the section dealing with what has come to be known as chemical warfare. This has been left to us as an unpleasant legacy of the late war, and it is very much to be feared that it will figure as a prominent feature of future wars unless the nations agree otherwise. The materials on which this branch of military operations depends may be classed as lethal compounds (" poison gas ") designed to kill, lachrymators (" tear gas "), vesicants and sternutatory compounds designed to produce varying degrees of disablement. Large quantities of benzene, toluene, and phenol were employed as raw materials for the production of these compounds.

Synthetic Resins

One of the most interesting and important of the developments in recent years is the commercial production of resins from coal tar products. There are at the present time a great number and variety of these substances. One that has figured very prominently is the so-called cumarone resin, which is a highly polymerised form of cumarone and indene. Solvent naphtha, which contains both of these compounds, is the raw material actually employed. The paint and varnish trades are the chief consumers of this product. It is a constituent of many varnishes, lacquers, coatings, etc., and is employed in the manufacture of certain rubber compositions. The most important of the artificial resins, however, are those obtained by the condensation of phenol and formaldehyde. Their manufacture is now a very considerable industry, the production now running into several million pounds annually, the bulk of which is produced by the Bakelite Corporation of America. There is an almost endless variety of resins prepared from phenol, the cresols, etc., and formaldehyde and other aldehydes. They enter into the composition of an extraordinary number of commercial articles, from electrical insulating materials to varnishes and lacquers, from cements and adhesives to artificial amber. The use of other coal tar products, such as toluene, xylene, and naphthalene, is also involved in some of the applications of these resins. We may mention at this point the many attempts that have been made to find a substitute for camphor in celluloid manufacture. Among the most successful of these are the triphenyl and tricresyl phosphates and hydrogenated cresol. The number of industries and trades which employ these artificial resins and plastic materials is already very large and is steadily increasing.

It is somewhat curious that the condensation of phenols and formaldehyde—surely one of the most important reactions discovered (in a commercial sense) in recent years—should lead

to another class of products whose application is quite different and distinct from that of the artificial resins mentioned above. In 1911 the Badische Company marketed a tannin substitute under the name of "Neradol." It proved a practical success, and its manufacture was undertaken in this country during the war. Since that time the production of synthetic tannins has developed considerably. Great activity is being shown in the preparation of new tanning materials, novel processes and products being constantly brought out by an increasing number of firms. Most of the information is contained in the patent literature, making it difficult to judge the value of the many claims put forward. The matter is little more than in its infancy at the present time, so that it must be left to the future to decide on the merits of the new products. There is no doubt, however, that a certain measure of success has already been attained. Not only phenol and the cresols but several other coal tar products have been employed, such as naphthalene and its derivatives, carbazole, anthracene, and phenanthene. For the most part it is the crude products that are used. Some of the products are employed direct as sulphonic acids, and with others condensation products are obtained without the use of formaldehyde. Sulphonated cumarone resins have also found application. The commercial success of these products bids fair to create another branch of the organic chemical industry, and has already added a new set of problems to the leather industry, but few outside these two industries are likely to be more than indirectly interested.

Rubber Accelerators

The use of organic compounds as accelerators in the rubber vulcanisation process dates from about 1912. Since then they have figured very prominently, owing, of course, to the vital importance of the rubber industry itself. The use of these accelerators has provided a further opportunity for coal tar products to increase their value. The list of substances for which claims have been put forward is already a long one, and activity in their production seems to be undiminished. It must be stated, however, that only a very few are used to any extent on the large scale. This is mainly owing to the peculiar combination of properties that must be possessed by an accelerator to make it commercially applicable. These desirable qualities are:—convenient critical temperature (i.e., temperature at which activity commences), which must be neither too high nor too low; no discolouring effect on the product; non-toxicity, and cheapness. Very naturally these considerations narrow the field considerably. Among the successful accelerators derived from coal tar products may be mentioned thiocarbanilide, anhydroformaldehydeaniline, the phenyl- and tolyl- guanidines, nitrosodimethylaniline, nitrosophenol, piperidine, and aniline.

Other Industries

In addition to those industrial uses of coal tar products which we have outlined above, there are a number of others which, if not possessing such a degree of prominence, are nevertheless sufficiently important to be specially mentioned. One particularly interesting development in recent years is the manufacture of the hydrogenated naphthalenes and phenols. They are now being produced commercially on a large scale. It is remarkable what a range of uses has been found for these products. The hydrogenation of naphthalene yields the tetrahydro- and decahydro- derivatives. These are the well-known tetralin and decalin. They are powerful organic solvents, and possess properties particularly desirable in industries which have to deal with fatty oils, waxes, and gums, especially the oil, paint, and varnish trades. They have a high flash point, evaporate slowly and completely, and are non-toxic. Tetrahydro-naphthol is employed as a disinfectant, especially in soaps. Hexahydrophenol (hexalin) has also found a number of important uses. It is an excellent solvent for many technical products, such as fats, oils, waxes, resins, rubber, celluloid, etc. The cresols yield similar reduction products. One of the most important properties of these hydrogenated phenols is that of dissolving or dispersing in aqueous soap solutions. The resulting colloidal solutions have powerful detergent and emulsifying properties. These new soaps have appeared on the market under various names. They find application as defatting and degreasing agents, but can equally well be employed for all ordinary purposes, such as in the laundry and household. They are also used as constituents of such preparations as pastes, polishes, and creams for furniture, metals, and leather, and in certain varnishes and lacquers.

The photographic industry depends for many of its most important materials on coal tar. We need only mention developers, such as amidol and metol. The application of dyestuffs in photography has already been referred to.

We shall conclude our survey with a reference to the general organic chemical industry, which supplies a number of compounds in general use both for reactions on the manufacturing scale and as important reagents in the laboratory. A perusal of the catalogues issued by the various manufacturers will give some idea of the number and variety of these compounds. We may mention benzoyl chloride and phenylhydrazine in illustration. The increased availability of many of these compounds is a direct result of the great increase in research work combined with the resolve to make ourselves independent of foreign supplies. Other nations, too, have been imbued with the same spirit of independence. The result is an increase in the activities of the whole chemical industry throughout the world. The summary we have given will, perhaps, serve to give some idea of the value of coal tar, upon the supply of which, as a raw material, so much of this industrial activity depends.

Maclaurin Process at Glasgow

Description of Plant and Products

On Monday Glasgow Corporation Gas Committee officially inspected at Dalmarnock the smokeless fuel plant for production by the Maclaurin process, and Mr. Maclaurin explained the various processes.

In general appearance the producer unit is somewhat like that of a blast furnace. Where the air enters a centre wall divides the plant into two equal sized chambers. The air enters through ports in the centre wall and also in the side walls opposite. The coke after cooling is discharged through chutes at the bottom. The kind of coal preferred is of the low coking variety, and the wagons are emptied by a rotary wagon tippler on to a grid, where any very large pieces are broken by hand. From this the coal passes to the foot of an elevator, and by this it is conveyed to the coal bunkers above the plant. These bunkers hold 200 tons of coal. After the producer is fully charged it takes 20 hours to raise the coal from 15° C. to the desired coking temperature, which is about 700° C. higher. The coal drops about one foot, and rises in temperature about 35° C. per hour. This very gradual increase in temperature modifies the nature of the coke, so that the product is quite different from the usual gas work product.

Gas and Other Products

The quantity of gas made per ton of coal regulates the type of coke produced. Black smokeless fuel is produced with a make of gas between 25,000 cu. ft. and 30,000 cu. ft., and the grey type when the gas yields are over 30,000 cu. ft. per ton of coal. From the Scotch coals tested, which contained from 6 to 10 per cent. of moisture, and from 30 to 35 per cent. of volatile matter, about 55 per cent. of smokeless fuel has been obtained. Before the coke is withdrawn it has to be cooled, and for this purpose steam is blown in at the discharging chutes. The steam first cools the coke and is then itself decomposed into water gas as it approaches the combustion zone. The calorific value of the water gas is about 300 B.Th.Us. At the combustion zone air at 60° C. saturated with water vapour maintains the temperature by burning out a portion of the carbon in the coke. Producer gas is made in this zone. This hot producer gas passing up supplies all the heat necessary for carbonisation. This gas has a value of 150 B.Th.Us., or thereby. Above the combustion zone there is a zone where the fuel is between 750° C. and 500° C., and here some ammonia is generated. Above this zone the coal is giving off oil and gas, and this is termed the distillation zone. In the upper regions oils are given off, and pass upwards through the fuel at gradually decreasing temperatures. Little decomposition therefore takes place, and in place of a benzenoid coal tar a highly phenolic crude oil is obtained.

The cooled coke drops into a trolley running below the plant, and is afterwards screened and prepared for use. The proportion of smokeless fuel produced per ton of coal carbonised varies with the kind of coal used.

Mond Nickel Anniversary Celebrations at Clydach

Statue of the Late Dr. Ludwig Mond Unveiled

We give below a report of Sir Alfred Mond's speech at Clydach on Saturday on the occasion of the unveiling of a statue of the late Dr. Ludwig Mond, together with a short summary of Dr. Mond's career.

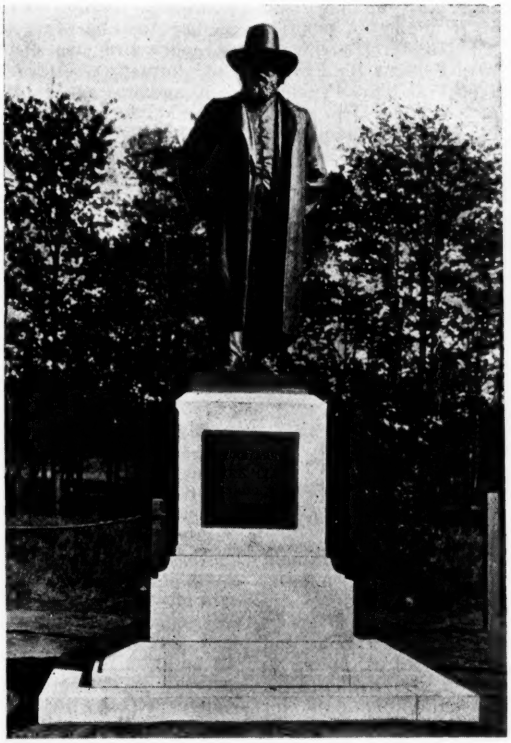
On Saturday, September 12, at Clydach, Swansea Valley, the 25th anniversary of the establishment of the Mond Nickel Works was celebrated and a statue of the founder, the late Dr. Ludwig Mond, F.R.S., was unveiled by Sir Alfred Mond (eldest son of the founder).

The celebration opened with an informal luncheon at the works' Institute, and the company included Sir Alfred Mond (chairman of the directors), Mr. Robert Mond (director) and Mrs. Mond, Viscount Erleigh (director) and Lady Erleigh, Dr. Carl Langer (director) and Mrs. Langer, Sir Ellis Griffith (director), Mr. R. Mathias (director) and Mrs. Mathias, Mr. D. Owen Evans (director) and Mrs. Evans, Mr. J. Mathias, Mr. Anthony Mathias, Major and Mrs. Brackley, Mr. and Mrs. Bertram Austin, Messrs. J. W. Brodie, F. B. Howard White, Dan Thomas, H. N. Miers, W. J. Percy Player, Otto Langer, E. Gibbon, H. Gibbon, H. C. Hawkins, and D. J. Evans (who acted as organising secretary).

Sir Alfred Mond on a New Industry

Sir Alfred Mond, speaking from a platform at the side of the statue, expressed regret at the unavoidable absence of his wife; of Mr. Emile Mond (deputy-chairman), who was absent through indisposition; and of his son, Mr. Henry Mond, who is in Rhodesia.

Sir Alfred said that 25 years ago the first sod of the green fields across the road was cut, symbolic of the commencement of the development of a new and important industry based on scientific discovery, the result of the joint work of his father and Dr. Carl Langer. The early days were anxious days, he said, but infantile diseases had been overcome and the child had grown into an adult of 25 years. He hoped that their policy of co-operation and good fellowship would continue.



There were only a few of them left who had been associated with the company from the beginning. Four members of the board, of whom three were present, his brother (Mr. Robert Mond), Dr. Carl Langer (who had never relaxed his interest in carrying the concern forward step by step), and himself and several of their staff and of their workmen; and to all those he extended the most cordial greeting from an old veteran. He was glad to think, that in spite of a by no means satisfactory condition in many industries, especially the heavy metal industry, so far as their branch of the work was concerned they looked forward with confidence not merely to a continuance but to an expansion of their business. (Cheers.)

Nickel Possibilities

" Nickel is one of the hand-maidens of modern metallurgical practice," he said, " and in combination with chrome steel and other metals there has been developed a series of new metals that will revolutionise engineering practice as we know it to-day by providing alloys of great strength capable of withstanding very strong temperatures and much less subject to corrosion, and with the materials now employed it opens up new possibilities which are only now beginning to be explored."

Referring to the unveiling ceremony which he was about to perform, Sir Alfred Mond said that the statue represented his father in most life-like and characteristic manner. " It is difficult for a son to speak objectively about one so near and dear to him as his own father," he continued, " but I say that as years roll by and as one grows himself to an older age one appreciates more and more the character, the genius, and the achievements of one of the greatest figures in the industrial science of his generation. He laid down as the first principle of his life devotion to duty, a desire for progress and honesty of purpose and fair dealing in all matters between man and man."

"An Inspiring Leader"

His prophetic insight extended far beyond the confines of even the scientific world, added Sir Alfred Mond. In every sphere of life he would have been an inspiring leader. It was characteristic of him that in one of the first years of the company's undertaking, when the financial results were disappointing, he voluntarily out of his own pocket paid the preference shareholders of the company the dividend which they would have received if the company had immediately been a financial success. He (the speaker) hoped the statue would stand there for many years after he would be gone, and that it would serve as a reminder and an inspiration to those workmen in the Mond Nickel Company of the founder of the business, and that they would always bear in mind his motto in life: " Make yourself necessary." (Cheers.)

Sir Alfred then unveiled the statue, and the large assembly stood bareheaded while the Mond Male Voice Party sang a hymn which the Rev. J. J. Williams (Morriston) specially composed for the occasion.

The statue in bronze by E. Lanteri has been cast by J. W. Singer and Sons, Ltd., of Frome, Somerset. Here from his granite pedestal the late Dr. Ludwig Mond, F.R.S., wearing his well-known dust coat and broad-brimmed hat, looks out upon the works which he was instrumental in creating. In one hand he holds a bundle of plans, while with the other hand he grips the walking stick without which he seldom walked afar. On the pedestal there is a bronze tablet engraved: " Ludwig Mond, F.R.S., LL.D. Born March 7th, 1839. Died December 11th, 1909."

A Remarkable Career

Ludwig Mond was born at Cassel on March 7, 1839. He was educated at Realschule and the Polytechnic School at Cassel, and afterwards went, in 1855, to study chemistry under Hermann Kolbe at Marburg. The following year he proceeded to Heidelberg, where he came under the eyes of Bunsen, the great teacher whose influence had held so great a sway in the two institutions in which the late Dr. Mond spent his earlier years. After three years with Bunsen, during which time Dr. Mond undoubtedly acquired that absorbing love of pure chemical science which characterised him in after life, he entered into industry at a small Leblanc soda works, near his native town, and after spending some time in several other factories in both Germany and Holland he came to England in 1862. It was in this year that Mond, while at Widnes, came in contact with the late Sir John T. Brunner, in conjunction with whom, eleven years later, he formed the world-famed firm of Brunner, Mond and Co., Ltd.

It was in 1884 that Mond took up his residence in London with a research laboratory attached to the house. It was about this time that in the course of experiments carried on with Dr. Carl Langer, who is so well known in South Wales, the discovery of nickel carbonyl was made, which led to a new process being devised by them for the extraction of nickel from its ores, and, subsequently, to the formation of The Mond Nickel Co., Ltd. To foster scientific research, Mond, in 1896, purchased a house next door to the Royal Institution at Albemarle Street, London, and, after converting it into a laboratory fully equipped with apparatus, which cost £45,000, presented it to the Royal Institution along with a sum of £62,000 as endowment, requesting that the building should be called the Davy-Faraday Laboratory. His idea was to provide a place where investigators could secure a means of pursuing their researches under the best possible conditions and free from financial embarrassment. A short while after he presented the sum of £14,000 to the Royal Society to defray the cost of a regular compilation of international scientific literature.

Dr. Mond was made a Fellow of the Royal Society in 1891, and in 1889 was elected President of the Society of Chemical Industry, which he was instrumental in founding. He received the honorary degree of D.Sc. from the Universities of Padua (1892), Heidelberg (1894), Manchester (1904), and of D.C.L. from Oxford in 1907; he was Foreign Member of the Accademia dei Lincei, of Rome (1899), and the Prussian Academy of Science (1909), Honorary Foreign Member of the Royal Society, of Naples (1908), and Honorary Member of the German Chemical Society (1908). The Grand Cordon of the Crown of Italy was awarded him in 1908.

In spite of nearly sixteen years having elapsed since his death, it is not yet possible to gauge the value of his work. The size and number of the factories which he was instrumental in creating give some idea of its importance, but the full benefit accruing to the nation from the energy, enterprise, courage, and foresight of this great industrial pioneer can only be assessed by regarding his achievements from a far higher standpoint than that of industrial success. Many generations to come will have good reason to remember the benefits which he conferred upon mankind.

British Industries Fair Revived

All British Goods Campaign

The British Industries Fair is to be revived next year, and will be held in London and Birmingham from February 15 to 26.

With a view to assisting British trade, the Government have decided to grant the sum of £20,000, to be expended in assisting the British Industries Fair.

This assistance will enable the Department of Overseas Trade to advertise the fair more extensively, both at home and overseas, and will reduce the cost of space to exhibitors to 2s. 6d. per square foot, instead of 3s., as in 1924, owing to the fact that 6d. per foot was added to exhibitors' costs for advertising purposes.

The success of these fairs depends entirely on the number of the exhibitors, and every effort is being put forward to induce manufacturers in all the trades included in the British industries Fair to take part in great numbers.

The projected help of the Government should make it possible to build up a fair for British goods equal to the great continental fairs, but it must not be forgotten that many years of steady work, under normal and prosperous conditions, have put these continental fairs in the position they now enjoy.

Good results should be expected from overseas as the result of the publicity given to British goods in the Empire Exhibition and other recent efforts, together with the gradual return to normal conditions.

The catalogue published by the Department, which contains a note of each exhibitor's productions without extra cost, is circulated to all important buyers throughout the world, either directly or through the British Consuls and others agencies, and this is in itself a good medium for advertising "All British Goods."

The interest that home trade buyers take in the fair also makes it of importance to those manufacturers who are chiefly engaged in the home market.

Dr. E. K. Rideal and "Professor Cobb's New Process"

To the Editor of The Chemical Age.

Sir,—In your editorial of August 22 you refer to Dr. Taylor and myself in connection with "Professor Cobb's new process" for the removal of sulphur from gases. As it would appear that the Government has failed to make use of the large mass of data collected by us on the subject, it might be of interest to give a brief summary of the conclusions I arrived at from the results of these investigations. Doubtless any gas company desirous of following up any of the methods there outlined could obtain the necessary information from the Government, if they are sufficiently fortunate to find the right Department.

It was found that a large fraction, but not all, of the sulphur compounds in hydrogen, water gas, coal gas, and vaporised hydrocarbon oils from Pennsylvania, Mexico, and Persia could be converted in hydrogen sulphide by low temperature hydrolysis with the aid of alumina and other catalytic agents. There was, in fact, nothing essentially novel in this work, for Gaudechon had already demonstrated the applicability of the hydrolytic method to carbon disulphide. Our extension to mercaptans and other hydrolysable sulphur compounds was in reality a reversal of the method developed by Sabatier for their formation. If this process could be developed economically and was applicable on a large scale with technical gases, it would effect a better purification than the Carpenter-Evans nickel process. The second stage in the investigation was devoted to an analysis of the catalytic behaviour of the hot oxide box with continuous revivification, a step only natural as a result of the success achieved by Harger and Terrey, Taylor and myself, in the selective oxidation of carbon monoxide in hydrogen. Dr. Taylor and I had the honour of demonstrating the recovery of sulphur as such, by the selective combustion of hydrogen sulphide in hydrogen with oxide of iron as catalyst, before the Royal Society after the war.

A detailed examination of the process revealed two defects. In the first case, the oxide of iron is not purely catalytic in its action. We were, in fact, unable to obtain any suitable material as catalyst which would have an industrial life comparable to, say, a "water gas" or even an "ammonia" catalyst. With oxide of iron, a slow but continuous conversion to the inactive basic sulphate always occurs. To overcome this difficulty, the slow passage of fresh oxide through the hot box was suggested. It will be interesting to find out how Dr. Cobb has been able to overcome this destruction of the catalyst.

The second difficulty to be overcome lay in the fact that, even if the oxygen-hydrogen sulphide ratio be adjusted correctly, a reverse reaction takes place:—

$$3S + 2H_2O \rightleftarrows 2H_2S + SO_2$$

In addition, if the catalytic chamber be long and the temperature somewhat too high, reaction between the sulphur vapour and the unsaturated hydrocarbons in the gas at the surface of the catalyst occurs. In excess of oxygen, sulphur dioxide was always present.

In order to overcome this difficulty, as a result of laboratory experiments, two suggestions were made for technical examination. It was suggested to part the gas stream and burn one fraction of the sulphur to sulphur dioxide and allow this gas to react with the hydrogen sulphide in the unburnt fraction, subsequently precipitating the sulphur as the result of mutual inter-reaction:—

$$2H_2S + SO_2 \rightleftarrows 3S + 2H_2O$$

utilising calcium chloride as catalytic agent. The other method suggested was ensuring the presence of small quantities of sulphur dioxide in excess, and removing the same with the aid of alkali, such as lime or ammonia.

I trust that I have not trespassed too far on your valuable space, but I feel sure that Professor Cobb and Mr. Hodsman must have carried their investigation much further than is indicated in your editorial in order to justify the claim to any novelty in the process attributed by you to them. I presume, however, that this question of sulphur removal is in reality one of minor importance at the present time, and that the excellent research organisations in our large gasworks are busily engaged in investigation as to what coals are suitable

for peptisation in oils, and what coals are most readily hydrogenated to the liquid state, so as to take advantage of the benefits of low temperature carbonisation, without the disadvantages of low thermal conductivity and high co-efficience of thermal expansion associated with the attempts to apply the process to coal, or even to the more suitable materials such as coal dust or briquettes.—I am, etc.,

The University, Cambridge. ERIC K. RIDEAL.
September 12.

Benzene and the Colleges

To the Editor of THE CHEMICAL AGE.

SIR,—Many of those who received castigation at the hands of Mr. W. P. Dreaper under the above title in your issue of August 1 will have been absent from their homes when it appeared, and consequently will not have been able immediately to offer any defence. Perhaps, therefore, a few words from me may not be so belated as would otherwise be the case, and as the victims of Mr. Dreaper's indignation comprise many of my old professional friends, including several former colleagues, I am constrained to make some resistance to his onslaught.

In the first place he appears to have mis-read his mentor because, if he studies more closely "Benzene and its Lessons," by Professor H. E. Armstrong (THE CHEMICAL AGE, July 25, p. 89) he will find that the professor there sheds the sackcloth and ashes of pessimism and proclaims himself a flower-decked optimist. It is true he is an optimist on condition that "all parties play the game, my own especially"; but as the professor is admittedly *sui generis*, he must be regarded as constituting his own party, and, using the words quoted, it is for him to play the game. If this be agreed, I suggest that his opening move, taken in conjunction with Mr. Dreaper, is to discontinue nagging the people who are trying to do the work. Those who are chemists naturally find it discouraging, whilst those who are not chemists resent it very strongly, and consider it intellectual arrogance which, in the lofty words of Mr. Dreaper, "is sometimes difficult to contemplate without scorn."

By this time Mr. Dreaper must know that Professor Armstrong's criticisms of things in general are more qualitative than quantitative. When the professor complains that "most arrant nonsense is being talked at the Chemical Society," he only means that plus-minusology fatigues him, and therein he has my hearty sympathy; to escape it, in fact, was one of my reasons for coming to India. On the other hand, although the most ardent champions of the new jargon devote so much energy to reviling their fellow-jargoneers that the less nimble-minded of us have long ago despaired of understanding even whether there is anything about which to quarrel, it is nevertheless quite conceivable that something useful may emerge. That is the essence and fun of research: you never can tell.

In support of his contention that the teachers are bad, Mr. Dreaper quotes Stephen Leacock as complaining that their (transatlantic) system "puts a premium on painstaking dullness, and breaks down genius, inspiration, and originality in the grinding routine of the college treadmill." Genius, inspiration, and originality are not so easily crushed, and because they have elevated themselves to a more majestic plane, such exalted spirits as Mr. Dreaper, Stephen Leacock, and Professor Armstrong must not overlook the stubborn fact that most of us others are painstakingly dull; it is we who need help, and we get it in the colleges. Is it suggested that Mr. Leacock would have been a more dazzling humourist if American college courses were more sprightly? I seem to remember reading an admission by Mr. Leacock that he embraced the profession of a humourist to escape the monotonous penury of a college career, which suggests that if the college treadmill had been less grinding the world might have lost much fun and honest laughter. Thus out of evil good may come.

Perhaps Mr. Dreaper never knew, and probably Professor Armstrong has forgotten, that the principal difficulty confronting a teacher who endeavours to train post-graduate students in the methods of chemical research is to find a problem sufficiently perplexing to maintain his own interest, and yet straightforward enough to offer reasonable expectation of solution within the student's period of study. Discouragement of the beginner must be avoided, but the goal must not be too easily discernible from the starting-point; otherwise the problem loses all zestful value and becomes an exercise in manipulation only. This method is the one honestly pursued by the teachers whom Mr. Dreaper decries, and nobody has yet devised a better. It is true that Mr. Dreaper has recommended teaching the principles of research in class, and would encourage groups of students to repeat "selected examples of original investigations as these were carried out by Faraday and his successors." If he were not well known to be a serious-minded gentleman, I should suspect him of "putting one over on us," as his American friends would say. For does he possibly imagine that Faraday himself, if alive to-day, could faithfully retrace the mental and material steps by which he carried out his investigations? Such investigations, like all those which have led to great discoveries, doubtless began with an aim, but how often could the discoverer give an accurate account of the mental operations which led to the ultimate result; particularly when it has to be recognised that this result frequently differs entirely from the original purpose? Faraday conducting a "class" in his own researches, under the general supervision of Mr. W. P. Dreaper, is one of the things I should like to see illustrated—by H. M. Bateman or George Morrow, if possible.

Insuperable obstacles hedge in Mr. Dreaper's method of teaching, and it may be doubted whether he has visualised the logical outcome of his proposals. Supposing, for example, he were holding a "class" on the genesis of Kekulé's benzene-ring theory, he must in common honesty conduct his party for an omnibus-drive along the Clapham Road. It would have to be a horse-omnibus, with knife-boards complete, and there might be some difficulty in securing the services of a driver; Mr. Dreaper might even have to drive it himself. Happily for the sobriety of the experiment, scientific accuracy would require the drive to be taken under cover of darkness, a piece of good fortune for Mr. Dreaper, because otherwise the mental operations of the class, and even Mr. Dreaper's own, might be distracted by uninvited contributions from the other omnibus-drivers.

Strange, indeed, are the bed-fellows of adversity, and it would be interesting to know whether the professor invited Mr. Dreaper to share his couch. Both are, theoretically, exponents of a system which has little to recommend it; whether known as heuristic or Dreaperian, it is unworkable. Practically, however, and this is really amusing, the method which Professor Armstrong followed in his own research-school is the very one I have indicated above as being practised by the conscientious and hard-working teachers despised by Mr. Dreaper. Even more comical is the fact that, although Professor Armstrong sometimes allows himself to dwell with justifiable pride on the achievements of his school, Sir William Pope and Professor Lowry appear in his estimation to be the only star-turns. It is true he makes the most of them, but where are the sea-lions of Mr. Dreaper? A reasonable conclusion is that if, by their united efforts, Professor Armstrong and Mr. Dreaper have produced only two distinguished chemists, they are not entitled to be so contumelious.—Yours, etc.,

Bangalore, August 26. M. O. FORSTER.

British Monomarks

To the Editor of THE CHEMICAL AGE.

SIR,—In your paragraph on "Monomarks" in THE CHEMICAL AGE of September 12, we note that you have given as an example of a trader's monomark "BM/RT3T," but this, as you will see from our literature, is a private individual's monomark, having the prefix "BM." All commercial monomarks issued in this country are prefixed by the letters "BCM," and it is important that there should be no confusion in the minds of people learning about the system for the first time. We shall be much obliged, therefore, if you could correct this point in your next issue.—Yours, etc.,

For British Monomarks, Ltd.,

19, Abingdon Street, S.W.1, H. U. S. NISBET.
September 12.

Chemical Trade Returns for August

Imports and Exports Show Decrease on Last Year's Figures

IMPORTS of chemicals, drugs, dyes, and colours (excluding mercury) for August totalled £1,053,339—a decrease of £217,653 as compared with August, 1924, and a decrease of £19,679 on the previous month. Exports are valued at £1,739,567—a decrease of £275,837 on the 1924 total, and a decrease of £295,068 on the value for July of this year.

The following detailed figures show that there is a marked decrease in the imports of alizarine, cream of tartar, and potassium compounds, and there has been no natural indigo mported. On the other hand, marked increases are recorded for borax, and painters' colours, while the figures for crude and refined glycerin are about ten times those recorded for August, 1924.

On the export side it is interesting to note the considerable increase in the sulphate of ammonia figures for Japan, Italy, and Dutch East Indies. Sulphuric acid, naphtha, and caustic soda are up, but benzol and toluol have dropped from 76,606 to 1,753 gallons, and naphthalene, tar oil, distilled glycerin, and potassium nitrate are down considerably. Mercury exports are halved as compared with last year.

Imports

	Quantities Month ending August 31.		Value Month ending August 31.	
	1924.	1925.	1924. £	1925. £
CHEMICAL MANUFACTURES AND PRODUCTS—				
Acid Acetic ....tons	737	565	44,143	28,707
Acid Tartaric .....cwt.	3,861	3,624	16,184	17,483
Bleaching Materials „	7,519	7,869	8,404	6,043
Borax............ „	3,192	7,200	3,799	8,561
Calcium Carbide... „	55,647	60,221	38,001	40,332
Other Coal Tar Products	—	—	112,858	69,593
Glycerin, Crude....cwt.	20	316	50	953
Glycerin, Distilled „	22	206	99	785
Red and Orange Lead „	3,533	2,289	6,756	4,457
Nickel Oxide...... „	3,700	2,022	19,035	11,297
Potassium Nitrate (Saltpetre)...... „	7,741	6,314	9,239	7,670
All other Potassium Compounds .... „	115,754	70,758	39,893	32,564
Sodium Nitrate ... „	172,968	183,680	109,890	113,459
All other Sodium Compounds .... „	17,297	19,631	16,458	14,899
Tartar, Cream of .. „	6,103	3,624	23,154	12,671
Zinc Oxide .... tons	820	886	27,311	29,629
All other Sorts ....value	—	—	222,843	182,530
DYES AND DYESTUFFS—				
Intermediate Coal Tar Products ....cwt.	22	398	585	3,939
Alizarine .... „	1,161	153	8,012	3,458
Indigo, Synthetic.. „	—	—	—	—
Indigo, Natural ... „	69	—	1,282	—
Other Coal Tar Products .... „	5,400	2,312	155,707	54,546
Cutch............ „	7,663	6,339	10,972	11,952
All other Sorts ... „	5,994	2,290	18,464	8,241
Extracts for Tanning „	84,056	99,522	82,104	93,086
Barytes, ground... „	57,390	70,142	15,188	16,068
White Lead (dry).. „	15,059	17,992	30,790	35,772
All other Painters' Colours, etc. .... „	64,304	106,840	105,633	113,338
MERCURY ....lb.	19,281	214,224	3,256	38,250
Total value	—	—	1,274,248	1,091,589

Exports

	Quantities Month ending August 31.		Value Month ending August 31.	
	1924.	1925.	1924.	1925.
CHEMICAL MANUFACTURES AND PRODUCTS—				
Acid Sulphuric ....cwt.	1,480	2,995	1,558	3,100
Acid Tartaric ..... „	922	974	5,765	5,387
Ammonium Chloride (Muriate) ....tons	298	215	8,550	6,760
Ammonium Sulphate				
To France ..... „	5,155	490	64,272	5,635
Spain, etc. „	10,629	8,676	136,834	99,812
Italy......... „	25	297	288	3,861
Dutch E. Indies „	692	1,404	9,296	17,600
Japan........ „	512	3,882	8,351	46,526
British West India Islands .... tons	827	1,396	11,074	17,688
Other Countries „	5,356	3,837	70,487	45,828
Total ...... „	23,196	19,982	300,602	236,950
BLEACHING POWDER (Chloride of Lime) cwt.	34,618	17,865	18,717	8,947
COAL TAR PRODUCTS—				
Anthracene ....cwt.	—	1,969	—	985
Benzol and Toluol galls.	76,606	1,753	7,025	249
Carbolic Acid......cwt.	8,465	9,173	17,825	13,099
Naphtha.........galls.	1,780	4,873	184	514
Naphthalene ......cwt.	1,660	531	1,661	426
Tar Oil, Creosote Oil, etc. ....galls.	5,233,363	2,537,925	200,743	80,214
Other Tar Products cwt.	30,014	37,800	18,404	20,062
Total ......value	—	—	245,842	115,549
COPPER, Sulphate of..tons	233	468	5,639	9,915
DISINFECTANTS, ETC. cwt.	30,866	30,698	88,568	76,599
GLYCERIN, Crude.... „	497	1,673	1,164	4,338
GLYCERIN, Distilled.. „	15,177	5,070	56,682	19,695
Total ...... „	15,674	6,743	57,846	24,033
POTASSIUM, Chromate and Bichromate ......cwt.	1,670	1,073	4,002	2,030
POTASSIUM, Nitrate (Saltpetre)...... „	1,650	656	3,571	1,440
All other Potassium Compounds .... „	1,457	1,367	13,527	12,650
Total ...... „	4,777	3,096	21,100	16,120
SODIUM Carbonate ...cwt.	534,887	382,642	134,570	117,044
Soda Caustic........ „	135,035	172,820	109,024	109,254
Sodium Chromate and Bichromate ...... „	4,181	2,259	8,084	3,761
Sodium Sulphate, including Salt Cake.. „	152,901	127,431	29,329	18,296
All other Sodium Compounds..... „	46,250	44,965	69,886	49,287
Total .... „	873,254	730,117	350,893	327,642
ZINC OXIDE ....tons	188	110	7,875	4,436
Chemical Manufactures, etc., all other Sorts value	—	—	257,310	304,768
Total ......value	—	—	1,370,265	1,140,206
DYES AND DYESTUFFS—				
Products of Coal Tar cwt.	9,054	7,452	83,875	57,728
Other Sorts ...... „	5,883	4,450	6,257	5,817
Total .... „	14,937	11,920	90,132	63,545
PAINTERS' COLOURS AND MATERIALS—				
Barytes, Ground...cwt.	8,376	946	4,199	454
White Lead (dry).. „	12,450	9,268	29,841	20,583
Paints and Colours, ground in Oil or Water .... „	28,247	36,646	67,422	86,178
Paints and Enamels Prepared (including Ready Mixed)... „	28,663	29,743	94,899	90,954
All other Sorts .... „	44,524	47,162	93,001	97,698
Total .... „	122,260	123,765	289,362	295,867
MERCURY ....lb.	49,217	17,299	7,783	3,002
Full Total value	—	—	2,023,187	1,742,569

From Week to Week

A CEMENT FACTORY is to be built at Foynes, Co. Limerick, by the Siemens-Schuckert Company.

LOW TEMPERATURE CARBONISATION EXPERIMENTS are now reported from Holland, and new plant is expected to be erected by local capital.

THE GLYCERIN DEPARTMENT of Lever Brothers, Ltd., has been removed from Lever House to 46-47, Chancery Lane, London, W.C.

REPORTS FROM BERLIN state that the Sichel Trust, an amalgamation of chemical, oil, iron, and allied industries, is in financial difficulties, owing to inability to liquidate its assets. It has applied, so far unsuccessfully, for bank loans.

MR. GREEVZ FISHER, head of the firm of Kingfisher, Ltd., lubricator manufacturers, Leeds, has attained his 80th birthday, and to mark this and his completion of 50 years' business in the city, he has been presented with a barometer and case by his staff.

MR. W. J. U. WOOLCOCK (chairman), Lady Trustram Eve, and Mr. A. E. Holmes are to inquire into an application by the British Brush Manufacturers' Association for an imposition of duty upon brooms and brushes. A committee is also to inquire into an application for a duty upon aluminium hollow-ware.

TO FURTHER AGRICULTURAL RESEARCH a bequest, expected to amount to between £20,000 and £25,000, was made by the late Mr. Colin Thomson, of Auchendrane, to the West of Scotland Agricultural College. It is to be employed in research work with the object of increasing the production of food and all kinds of crops.

A CHEMISTS' DINNER is to be held in London on Friday, November 13. The arrangements are in the hands of the Chemical Industry Club, and all other societies interested in chemistry will participate. Tickets will be obtainable from the Secretary of the Club, 2, Whitehall Court, London, S.W.1, and further details will be announced later.

RECENT TENDERS ACCEPTED INCLUDE: Sulphuric acid plant for manufacture of 7,000 tons of acid per annum, for Bradford Town Council, Mills Packard Construction Co., Ltd., Ipswich. Percolating filters and humus tanks for Dewsbury Corporation, S. Johnson and Son (Mirfield), Ltd., £40,253 0s. 11d.; sludge pumps, Drysdale and Co., Ltd., £999 2s.

A NEW STEEL is reported to have been discovered in Germany which will be 40 per cent. lighter and 30 per cent. cheaper than ordinary steel. The new product is said to possess resistance, flexibility and fluidity. Some reports ascribe the invention to a Swiss named Bosshardt, and refer to it as "freund steel," others give the inventor as the late Herr Jonas, sometime manager of the Berlin Foundry and Machinery Corporation.

WITH REFERENCE TO A RUMOUR in the pottery and glass trades that a Belgium Congo concern will shortly be able to supply large quantities of cobalt, we are definitely informed that the Union Minière du Haut Katanga proposes to start about the end of next month marketing cobalt, cobalt oxides, and cobalt salts in this country. The company claims that the capacity of its plant is sufficient to meet the whole of the world's present requirements.

DR. WILLIAM FRANCIS BARKER, formerly of Ilkley, who about two years ago was appointed Lecturer in Chemistry at Cape Town University, has now been appointed Professor of Organic and Inorganic Chemistry at Rhodes University College, Grahamstown, South Africa. Dr. Barker is only 24 years of age, and before his Cape Town appointment was personal research assistant to the Professor of Inorganic Chemistry at Liverpool. He took his B.Sc. in 1920 with first-class honours, and his D.Ph. in 1922.

ARTIFICIAL SILK IS TO BE MANUFACTURED in Manchester at a factory to be erected, probably at Littleborough, near Rochdale. This works was formerly an asbestos factory. The chairman of the new company will be Sir Edwin Stockton. The directors will include Sir Percy Woodhouse, Mr. Frank Turner, a director of Bell's United Asbestos Co., Ltd. It is understood that the capital of the new concern will probably be between £300,000 and £400,000, and the industry will find employment for several hundred people. The contracts for the necessary machinery will shortly be entered into, and managerial arrangements are now under consideration.

THE INSTITUTE OF METALS has just issued its programme for the session 1925-26, which begins in October. Six lectures on metallurgical subjects are to be given during the winter months before each of the Institute's local sections, in Birmingham, Glasgow, London, Newcastle-on-Tyne, Sheffield, and Swansea. The programme also includes particulars of the meetings of the parent Institute in London; one of these is the 1926 May lecture, to be given by Professor H. C. H. Carpenter, F.R.S., on "Single Metallic Crystals and their Properties." A copy of the programme can be obtained from Mr. G. Shaw Scott, The Institute of Metals, 36-38, Victoria Street, London, S.W.1.

MR. H. S. HORNE has joined the board of the Novacrete and Cement Products Co.

SIR FRANK HEATH, secretary of the Department of Scientific and Industrial Research, is to visit Australia shortly.

FIRE CAUSED SLIGHT DAMAGE at the oil and paint works of R. H. and N. Cook, Pandon, Newcastle-on-Tyne, on Friday, September 11.

IT IS UNDERSTOOD that the Chemistry Section of the British Industries Fair is to be held in London and that Mr. W. J. U. Woolcock is to be in charge.

THE EXPLOSION of an acetylene generator did considerable damage at the works of George Cooper and Sons, Sheffield, on Wednesday. The plant was wrecked.

THE COUNCIL OF FINSBURY TECHNICAL COLLEGE has heard from the London County Council that it is not justified in continuing its support of the College after July 31, 1926.

DR. PAUL K. BREUER, Berlin, has been appointed director of the Associacion Carbonnera de Chile, a central organisation for fuel research. Dr. Breuer has been director of the analytical department at the Mulheim Institute for Coal Research.

THE DEATH of Mr. Andrew Ferrie, 35, of Didsbury, a director of the Egerton Chemical Co., Salford, was thought to have been caused by him drinking nitric acid by mistake. A verdict of "Accidental Death" was returned at Manchester on Wednesday.

THREE NEW SUGAR BEET FACTORIES are to be erected on sites at York, Felstead, Essex, and in Fife, by the Anglo-Scottish Sugar Beet Corporation. It has been agreed that 99 per cent. of the machinery and plant (involving an expenditure of £1,000,000) shall be British made.

CONCERNING THE OIL SHALE INDUSTRY in Scotland Sir Burton Chadwick, of the Board of Trade, replying to a deputation of the Union of Shale Miners and Oil Workers, said that the Government had considered the case of Scottish Oils, Ltd., but could not see their way to give financial assistance to the industry.

GERMAN DYE TRUST NEGOTIATIONS are reported to have led to an understanding in principle. When complete, the amalgamation should constitute one of the largest in the history of German industry, designed to achieve greater economy in administration and working without destroying the individuality of the concerns.

SOME 160 members of the Sanitary Inspectors' Association visited the works of the United Alkali Co., Ltd., at Widnes, on Thursday, September 10. Dr. G. C. Clayton presided at a luncheon, and Sir William Collins, president of the Association, in a vote of thanks, regretted the small representation of medical and chemical interests in Parliament.

AT THE INQUEST on Thomas Parker Cook, aged 23, research chemist, who was found dead in his laboratory at Teddington on Sunday, the verdict was "Death from accidental strangulation." He was understood to have made an important metallurgical discovery and to have been working on it in the laboratory of the company which had been formed to exploit the patent.

A NEW POST OFFICE CONCESSION to encourage export trade is the offer of a free telegraphic address that will be registered at the Post Office in the same way that an address is registered for inland telegrams. It is considered that the offer will effect considerable economies, particularly where firms have numerous overseas representatives. Particulars are obtainable from the Postmaster-General.

TO ESTABLISH A MEMORIAL to the late Sir George Beilby a joint committee of officers and representatives of the Institute of Chemistry, the Institute of Metals, and the Society of Chemical Industry has been formed, and hopes to raise not less than £5,000 to provide an income from which at certain intervals substantial sums will be awarded in appreciation of distinguished work in science, bearing in mind the special interests of Sir George—applied chemistry, chemical engineering, and metallurgy. Subscriptions are invited, and Messrs. P. H. Kirkaldy and John Fry are hon. treasurers.

Obituary

MR. WILLIAM HENRY DEERING, at Torquay, aged 76. He was for many years chemist to the War Department at Woolwich Arsenal. He had previously been Assistant Chemist at the Arsenal since 1867. He was a fellow of the Chemical Society and of the Institute of Chemistry.

MR. W. J. PALMER, F.I.C., director of Burrell and Co., Ltd., paint manufacturers, Millwall, London, E., aged 47, at Eltham, on September 8. He was a Fellow of the Institute of Chemistry and a prominent member of the Oil and Colour Chemists' Association, being a vice-president and member of the Council at the time of his death.

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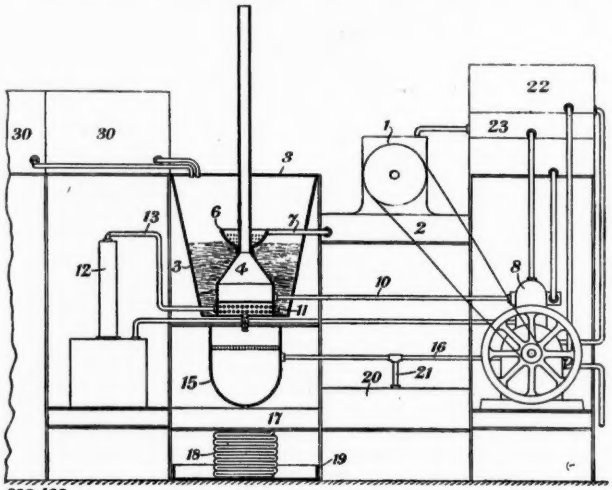
Abstracts of Complete Specifications

238,428–9. CONCENTRATED BORIC ACID, MANUFACTURE OF FROM CRUDE BORATE OF LIME (BORONATROCALCITE). E. L. Fleming, 14a, Bungalow, Exmouth, Devon, and Atlantic Chemical Co., Ltd., St. Paul's Square, Liverpool. Application date, November 22, 1924.

238,428. When drying crude borate of lime containing 28 per cent. boric oxide and 50 per cent. water, a calcined borate containing 44 per cent. boric oxide is obtained, but the percentage of sand, salt, lime, gypsum, etc., is also increased. In the present process, crude borate of lime is made into a pulp with sufficient water to enable it to be passed through the pipes, and the pulp is then heated to boiling point by the admission of hot sulphur dioxide and by heat from other sources. The products are boric acid, sodium chloride, and sodium sulphite, which are soluble, and calcium sulphite, sulphate, and sand, which are insoluble. The liquid is filtered on a vacuum filter, and the filtrate is rapidly cooled to obtain crystalline boric acid. The acid is dried on a vacuum drier at as high a vacuum as possible.

238,429. This relates to a plant for carrying out the process described in 238,428 above. The crude borate of lime is pulped with hot water in a machine 1 driven by a crude oil engine 8. The quantity of water required is four times



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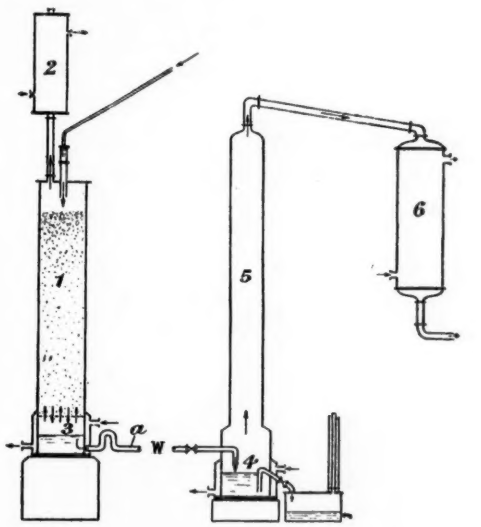
the content of crystallised boric acid. The pulp is run into a tank 2 where some of the sand and gypsum settle out, and then through a pipe 7 and perforated distributor 6 to a vessel 3. The hot combustion gases from the engine 8 pass through a pipe 10 to a heating chamber 4 to heat the pulp. Sulphur is burned in a burner 12 and the hot sulphur dioxide passes through a pipe 13 and through the perforations 11 into the hot pulp. The resulting mixture of boric acid, sodium chloride, sodium sulphite, calcium sulphite, calcium sulphate, and sand is run into a vacuum filter 15, and the filtrate runs into a tank 17, and thence over a cooler 18 to crystallise the boric acid, which is collected in the tray 19. The crystals are transferred to a vacuum drier 20 which is connected by the pipe 21 to a suction pipe 16, which connects the vacuum filter 15 to a vacuum pump. The supply of hot water is obtained by passing cold water from the tank 22 through the engine jacket to the tank 23, which supplies it to the pulping machine. Any excess of sulphur dioxide is recovered in scrubbers 30 containing borate of lime which when spent is transferred to the pulping machine 1.

238,485. CELLULOSE ESTERS, SOLUTIONS OF. E. C. R. Marks, London. From Carbide and Carbon Chemicals Corporation, 30, East 42nd Street, New York. Application date, April 3, 1925.

The object is to obtain solutions of cellulose esters as lacquers, etc. In this invention the usual solvents are replaced by the mono or dialkyl ethers of ethylene glycol. Such compounds include the monomethyl ether, dimethyl ether, monoethyl ether, diethyl ether, monopropyl ether, dipropyl ether, monoallyl ether, di-isobutyl ether. Some of these ethers, particularly the monoethyl ether, are practically odourless compared with the amyl and butyl acetates frequently used. The ethers contain no acid radicle and do not hydrolyse. Solutions of cellulose esters are rapidly obtained by using these substances, *e.g.*, a mixture of the monoethyl ether and ethylene dichloride will form a lacquer with cellulose acetate in three to four minutes, but neither of these substances is a solvent by itself for cellulose acetate. The lacquer is improved by the addition of 1–2 per cent. of a high boiling solvent for the cellulose acetate, such as glycol mono or diacetate, acetylene tetrachloride, diacetone alcohol. An auxiliary solvent or diluent is usually employed in addition to the above ethers.

238,489. CRUDE CARBON DISULPHIDE, PROCESS FOR THE CONTINUOUS PURIFICATION OF. E. Legeler, Premnitz, Germany. International Convention date, September 3, 1924.

In this process, crude carbon disulphide is freed from sulphur, hydrogen sulphide, and organic compounds in a continuous working process. Small quantities only of carbon disulphide are in circulation, so that the danger of the process is reduced. The carbon disulphide is first freed from hydrogen sulphide by counter-current contact with carbon disulphide vapour, and the sulphur and sulphur compounds are then withdrawn from the carbon disulphide as a highly concentrated solution. The tower 1 in which the crude disulphide is treated with carbon disulphide vapour is surmounted by a reflux condenser 2 in which the carbon disulphide vapour is condensed. The disulphide, freed from hydrogen sulphide, collects in the chamber 3 and passes through a pipe *a* to a desulphurisation column. Another tower may be interposed in the tower *a* at W, in which the carbon disulphide is treated with soda lye or acid. The retort 4 contains a concentrated solution of sulphur in carbon disulphide, *e.g.*, 170 parts of sulphur in 100 parts of carbon disulphide. This solution is heated by a



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steam jacket to 55° C., and the partly purified carbon disulphide which flows into it is vaporised, leaving the sulphur and organic sulphur compounds in the concentrated sulphur solution. This solution is periodically drawn off to a vessel containing cold water, where most of the sulphur crystallises out. The carbon disulphide vapour is purified in a column 5, and recovered in a condenser 6.

D

238,347. Extraction of Metals from their Compounds. A. S. Cachemaille, 2 Norfolk Street, Strand, London, W.C.2. Application date, July 7, 1924.

The process is for obtaining the metals from refractory oxides such as those of zirconium, uranium, thorium, vanadium, tantalum, chromium. The reduction is effected by means of an alkali metal and either an alkali metal halide or an alkaline earth halide. In an example, applied to the reduction of zirconium oxide, an intimate mixture of zirconium oxide 75 parts, sodium 100 parts, and barium chloride 470 parts, is placed in an airtight iron crucible which is heated to bright redness. The quantity of sodium and barium chloride used is about 100 per cent. in excess of the theoretical quantity. The reaction is represented by the equations :—

$$2BaCl_2 + 4Na \rightleftarrows 4NaCl + 2Ba$$
$$2Ba + ZrO_2 = 2BaO + Zr$$

The first equation is reversible, but the barium is continuously removed by interaction with the zirconium oxide so that the reaction proceeds to completion. The reaction may alternatively be regarded as a solution of zirconium oxide in barium chloride forming barium chlorzirconate, $BaZrCl_6$ which is then reduced by the sodium to form zirconium. The mixture is then cooled, and the excess sodium removed for use again. The mixture is saturated with alcohol to prevent too violent a reaction between any sodium remaining and the water which is then added to convert it into the hydroxide. Some of the soluble salts are then removed by washing with water, and the remainder by solution in hydrochloric acid, leaving metallic zirconium. Other suitable mixtures may also be employed in which the free alkali metal is more electro positive than the alkali metal of the halide, *e.g.*, chromium oxide may be reduced by sodium chloride and potassium.

238,314. Synthetic Menthol. Howards and Sons, Ltd., Uphall Works, Ilford, Essex, and J. W. Blagden, Apple Tree House, Grove Road, South Woodford, London, E.18. Application date, May 21, 1924. Addition to 213,991.

The process for the catalytic hydrogenation of thymol described in Specification No. 213,991 (see The Chemical Age, Vol. X, p. 522) is applied to piperitone or methone. These compounds yield on hydrogenation a mixture of a crystalline solid which is an optically inactive menthol, and a liquid which is an isomer. When the compound ceases to absorb hydrogen, a mixture of these two substances in certain proportions is obtained, and it has been found that this proportion can be varied by agitating the mixture with hydrogen in the presence of a catalyst of nickel or cobalt, or nickel and copper. A much larger proportion of the solid menthol is thus obtained. The second treatment with hydrogen is effected at 110°–120° C.

Alternatively, the crystals may be separated from the mixture obtained by hydrogenation, and the remaining liquid then mixed with the original compound and the mixture hydrogenated. The parent compound is thus hydrogenated, and part of the added residue is converted into the crystalline form. When the mixture is again cooled, the proportion of crystals obtained is larger than if the parent compound alone had been hydrogenated. The process may thus be conducted by hydrogenating the parent compound in successive batches, the liquid residue from each being added to the next batch. In another alternative, the liquid residue alone may be treated with hydrogen at 110°–120° C. in the presence of a catalyst to convert part of it into the crystalline product. Some detailed examples are given.

238,319. Oxygenated Organic Compounds, Manufacture and Production of. J. Y. Johnson, London. From Badische Anilin und Soda Fabrik, Ludwigshafen-on-Rhine, Germany. Application date, May 24, 1924.

Specifications Nos. 227,147, 229,714-5 (see The Chemical Age, Vol. XII, pp. 161 and 337) describe the production of methanol by the catalytic reduction of carbon monoxide or dioxide with hydrogen at a high temperature and pressure in the presence of a catalyst free from iron, nickel, or cobalt. It is now found that if the gaseous mixture is passed over the catalyst at a slower speed than the minimum necessary to produce methanol, oxygenated organic compounds of a higher order than methanol, mainly higher alcohols, are obtained. Any portions of the apparatus liable to become hot should be free from iron, nickel, or cobalt, and volatile compounds of these metals should be removed from the gas mixture. The apparatus may be constructed of copper, silver, aluminium, or alloys such as copper-manganese, or special steels containing a substantial proportion of chromium, tungsten, vanadium or molybdenum. The catalyst may be the same as that employed in the production of methanol, especially the metallic oxides, which are non-reducible by hydrogen or carbon monoxide at temperatures up to 550° C. The catalyst may also contain a potassium compound. The product contains methanol, higher alcohols, aldehydes, amines, and liquid hydrocarbons, and these may be separated in any suitable way. The temperature employed in the production of these compounds is 350°–500° C. Reference is directed in pursuance of Section 7, sub-section 4, of the Patents and Designs Acts, 1907 and 1919, to Specification No. 20,488, 1913.

238,385. Finely Divided Sulphur, Manufacture of. W. F. Sutherst, 903, Pennsylvania Avenue, Riverside, Cal., U.S.A., and H. Philipp, 211, Broadway, Keyport, N.J., U.S.A. Application date, September 5, 1924.

Colloidal sulphur is produced by treating alkaline earth metal (including magnesium) polysulphides, or alkali polysulphides, or ammonium polysulphides, and sulphur dioxide at a temperature as much below 60° C. as possible. The substance to be treated may be that obtained by the reaction of lime, sulphur, and sodium sulphate. The above reaction takes place in two stages :

$$3Ca(OH)_2 + 6S_2 = 2CaS_5 + CaS_2O_3 + 3H_2O$$
$$2CaS_5 + CaS_2O_3 + 3Na_2SO_4 = 2Na_2S_5 + Na_2S_2O_3 + 3CaSO_4.$$

These reactions may be operated so that the second commences before the first is completed. In carrying out the process, water is boiled and sufficient quicklime is added to make a 20 per cent. calcium hydroxide. The milk of lime is heated to boiling point, and a mixture of finely divided sulphur in water added. The mixture is boiled and agitated until the first reaction is complete, and a boiling solution of sodium sulphate is then added. The mixture is then filtered yielding a liquor containing polysulphides and sodium thiosulphate. This liquor is cooled as near 0° C. as possible, and treated with cold sulphur dioxide according to the equation :

$$2Na_2S_5 + Na_2S_2O_3 + 3SO_2 = 3Na_2S_2O_3 + 9S.$$

If this reaction is effected at a low temperature, the sulphur is precipitated in colloidal form. It is found that if the temperature is allowed to rise to 60° C. by the heat of the reaction the amorphous sulphur is converted into crystalline form. The temperature may be higher if the sulphur dioxide is added more slowly. The precipitated sulphur is separated from the sodium thiosulphate, which is then evaporated and crystallised. The very fine colloidal sulphur obtained will remain in suspension in water without the addition of any additional products such as glue, and the sulphur is so finely divided that its fungicidal and insecticidal properties are much greater than those of the coarser sulphur employed for agricultural purposes.

Dry colloidal sulphur can be obtained by drying the sulphur paste at temperatures below 60° C., preferably in a chamber containing a dehydrating agent such as sulphuric acid or calcium chloride, or in an atmosphere from which the moisture has been removed. The dried colloidal sulphur is also suitable for horticultural purposes, and as a medicinal product. A detailed description of the plant employed is given.

Note.—Abstracts of the following specifications which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention : 215,790 (Metal Traders Technical, Ltd.), relating to concentration of sulphuric acid, see Vol. XI, p. 101 ; 218,998 (Rhenania Verein Chemischer Fabriken Akt.-Ges. and H. Brenek), relating to solution of minerals containing alkali and alumina, see Vol. XI, p. 298 ; 219,304 (Soc. of Chemical Industry in Basle), relating to manufacture of acylated diamines, see Vol. XI, p. 299 ; 224,497 (Soc. Anon. des Petroles, Houilles, et Derives), relating to dehydration, distillation, and cracking of hydrocarbons, see Vol. XII, p. 59 ; 225,545 (Farbwerke vorm. Meister, Lucius, und Brüning), relating to a device for feeding salt cake furnaces, see Vol. XII, p. 117 ; 225,866 (E. Smith), relating to a process for vulcanising rubber, see Vol. XII, p. 138 ; 226,801 (Vacuumschmelze Ges. und W. Rohm), relating to refractory linings for hearths of metallurgical furnaces, see Vol. XII, p. 23 (Metallurgical Section).

International Specifications not yet Accepted

237,228. PRODUCING ACETONE AND BUTYL ALCOHOL BY FERMENTATION. G. W. Freiburg, 5145, Kensington Avenue, St. Louis, Mo., U.S.A. International Convention date, July 17, 1924.

Carbohydrate or like material is fermented with an anaerobic bacillus, B. butylaceticum, which has rounded ends, forms large resistant spores, and does not readily liquefy nutrient gelatine. To obtain this bacillus, grain or soil is added to sterile boiling water to destroy non-sporing organisms, and those forming slightly resistant spores, and an anaerobic culture of the remaining organisms is then prepared. A hot, sterilised mash of potato, rice, or maize is then treated with the culture for twenty-four hours at 35°–38° C. Carbon dioxide and hydrogen are first evolved, and the acidity then declines, and acetone and butyl alcohol are produced. The products are distilled off, and the fermented mash used to prepare further cultures or to inoculate fresh material.

237,243. METALLIC OXIDES AND SULPHUR TRIOXIDE. R. Jacobson, Kageröd, Sweden. International Convention date, July 16, 1924.

Iron or aluminium sulphate or alum is heated in vacuo, yielding sulphur trioxide and the metallic oxide. Ferric sulphate may be heated to 630° C. at a pressure of 50 mm. in an iron retort. The sulphur trioxide is used for making sulphuric acid to produce more of the sulphate.

237,257. SULPHUR OXIDATION PRODUCTS. T. Chmura, Polytechnikum, Lwów, Galicia, Poland. International Convention date, July 15, 1924.

Sulphur and the less oxidised sulphur compounds such as sulphur dioxide, sulphuretted hydrogen, sulphur chloride and sulphur ores are burned in just sufficient air to convert the sulphur into trioxide. The dioxide and trioxide produced are separated under pressure rising to 1,000 atmospheres, leaving nitrogen for the synthesis of ammonia. Non-gaseous matter is separated from the gases centrifugally or electrically, and water is eliminated by means of sulphuric acid. Sulphur dioxide may be absorbed in alcohol, or glycerine, and sulphur trioxide in sulphuric acid. During compression other residual products can be removed by absorption or chemical combination. The yield of sulphur trioxide may be increased by subjecting the gases to ultra-violet rays or to an electrical discharge. The reactions may be effected in an internal combustion apparatus which is described.

LATEST NOTIFICATIONS.

239,527. Method of preparing menthol from *p*-cymene. Austerweil, G. August 21, 1923.

239,531. Process for the manufacture of glue or gelatine in the form of discs or tablets. Compagnie Nationale de Matières Colorantes and Manufactures de Produits Chimiques du Nord Reunies Etablissements Kuhlmann. September 4, 1924.

Specifications Accepted with Date of Application

238,931. Liquid fuel similar to petrol, Manufacture of. E. A. Prudhomme. May 23, 1924.

229,619. Pine tars, Process for the purification of. A. Wohl, A. Goldschmidt, and A. Prill. February 19, 1924.

211,895. Ores and metallurgical products, Process of splitting up. H. Skappel. February 26, 1924.

230,046. Hydrogen-producing apparatus. Oxhydrique Française. February 29, 1924.

230,106. Carbon monoxide from industrial gases, Method for the extraction of. A. A. L. J. Damiens. March 3, 1924.

231,468. Borneols, Manufacture of. Soc. Alsacienne de Produits Chimiques. March 28, 1924.

231,810. Cellulose derivatives, Manufacture of. L. Lilienfeld. April 4, 1924.

236,563. *P*-oxy-*m*-amino-phenylarsinic acid, Manufacture of ureas of—and aminoacidyl derivatives thereof. Chemische Fabrik auf. Actien (vorm. E. Schering). July 2, 1924.

238,936. Dyeing of cellulose acetates. E. G. Beckett, J. Thomas, and Scottish Dyes, Ltd. May 26, 1924.

238,938. Partial oxidation of paraffin hydrocarbons in the gaseous phase. E. C. R. Marks. (*Carbide and Carbon Chemicals Corporation.*) May 26, 1924.

238,956. Electrolytic process and apparatus. G. B. Ellis. (*Roessler and Hasslacher Chemical Co.*) May 28, 1924.

238,962. Electrochemical treatment of copper ores. H. S. Mackay. May 29, 1924.

239,045. Light hydrocarbons, such as gasolene, Process of producing by distillation of solid carbonaceous materials. M. J. Trumble. September 2, 1924.

239,065. Tar separators. R. W. James. (*Lignojen Maschinen and Apparatebau Ges.*) October 7, 1924.

239,069. Carbonaceous material, Process of distilling. H. Fairbrother. (*Jackson Research Corporation.*) October 13, 1924.

239,105. Gas-cleaning apparatus. J. P. Dovel. January 21, 1925.

238,917. Ozone, Production of. J. F. V. Pourbaix. March 28, 1924.

Applications for Patents

Aktiebolaget Separator. Purification, etc., of lubricating oil. 22,561. September 9. (United States, September 26, 1924.)

Bemberg Akt.-Ges., J. P. Filter presses. 22,463. September 8. (Germany, October 9, 1924.)

Binz, A. Deutsche Gold- und Silber-Scheideanstalt vorm. Roessler, und Räth, C. Production of 2 hydrazino-5-nitropyridine. 22,640. September 10.

Budnikoff, P. Manufacture of cementitious substances. 22,321. September 7.

Carpmael, W., and Farbenfabriken vorm. F. Bayer und Co. Manufacture of pharmaceutical products, etc. 22,355. September 7.

Chemische Fabrik auf Actien vorm. E. Schering and Jordan, H. Manufacture of hydrated dioxydiphenylmethane compounds. 22,546. September 9.

Coley, H. E. Production of magnetic oxide of iron. 22,304. September 7.

Coley, H. E. Rotary furnaces, etc. 22,307. September 7.

Farbwerke vorm. Meister, Lucius, und Brüning. Refining decamphorated oil of turpentine. 22,817. September 12. (Germany, September 12, 1924.)

Gulf Refining Co., and Haddan, A. J. H. Process for removing aluminium chloride from vessels. 22,738. September 11.

Hutchison, H. Centrifugal pumps. 22,805. September 12.

Imray, O. Y., and Soc. of Chemical Industry in Basle. Manufacture of diarylamines. 22,749. September 11.

Montecatini Soc. Generale per l'Industria Mineraria ed Agricola. Apparatus for production of synthetic ammonia. 22,461. September 8. (Italy, September 24, 1924.)

Morgan Crucible Co., Ltd. Pottery, etc., kilns. 22,565. September 9.

Patronilleau, L. G., and Soc. Anon. Alumine et Dérivés. Manufacture of alumina, etc. 22,416. September 8. (France, September 29, 1924.)

Perkin, F. M. Apparatus for treatment of peat. 22,454. September 8.

Saureschutz Ges. Production of chemically-stable vessels, apparatus, etc. 22,667. September 10. (Germany, April 11.)

Sazanoff, P. P. Process for printing with basic dyestuffs. 22,771. September 11.

Soc. Chimique des Usines du Rhône. Manufacture of phosphoric ethers of carbohydrates, etc. 22,319. September 7. (France, April 27.)

Watkins, G. Preventing scale, etc., in steam-boilers. 22,415. September 8.

Research in the Cotton Industry

MR. KENNETH LEE, presiding at the annual meeting of the British Cotton Industry Research Association, at Manchester, said he was convinced that, as the result of research work, the cotton industry was on the brink of a new era. Dr. A. W. Crossley, director of the Shirley Research Institution, described the year's work as of steady, uninterrupted progress. The report included details of specific investigations on subjects such as mildew, bleaching and dyeing, steeping, and scouring.

The report stated that there was considerable divergence of opinion as to the loss of weight incurred by cotton during scouring. By means of the experimental kier it had been found that, under conditions which reproduced the effects of normal technical pressure boiling, American cottons lost from 6 to 7 per cent., Egyptian and South American cottons from 7 to 8 per cent., and Indian cottons from 8 to 9 per cent. of their grey weight. Only one cotton—Pima—had been found to exceed this last figure materially. The loss took place for the most part on scouring without pressure, and the analytical characteristics of the scoured material (residual wax, absorption of methylene blue, and copper number) reflected the scouring loss satisfactorily. In equivalent concentration soda ash was slightly less effective than caustic soda, and lime than soda ash. In practice the full effect of lime boiling was rarely attained, and analyses of trade samples taken from the same kier indicated that the loss in a normal pressure boil with lime varied between that caused by water alone and that which would be caused by boiling with caustic soda without pressure.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, September 18, 1925.

THE market during the last week has been rather brighter, and there has been a better uptake although the demand in most directions is still far below normal. Prices generally are well maintained. The export market is without special feature.

General Chemicals

ACETONE has been well inquired for, prices being unchanged at £75 to £76 per ton.

ACETIC ACID passes steadily into consumption, Technical being quoted at £37 to £37 10s. per ton, and Pure at £38 10s. to £40 per ton for the 80% grades.

ACID CITRIC is weak consequent upon the scarcity of demand.

ACID FORMIC is in fair demand, prices being a little easier at £47 to £48 per ton for the 85% Technical.

ACID LACTIC is in moderate demand, prices unchanged.

ACID OXALIC.—There is a better demand. The price is firm at 3¾d. per lb.

ACID TARTARIC is particularly quiet, nominal price being 11¼d per lb.

ALUMINA SULPHATE.—The demand is better, more interest is being taken consequent upon the very low prices. Any change in value is likely to be in the upward direction.

ARSENIC.—There is almost an entire absence of demand. Prices quite nominal.

BARIUM CHLORIDE is well inquired for. Price £9 per ton.

CREAM OF TARTAR is still firmer and higher prices are expected. Quoted to-day at £74 to £75 per ton.

EPSOM SALTS are in steady demand at £5 to £5 5s. per ton.

FORMALDEHYDE is in very short supply. A premium is obtainable in early positions. Price £41 to £42 per ton.

LEAD ACETATE is rather firmer at £45 10s. per ton for the White and £40 per ton for the Brown.

LIME ACETATE is a nominal market at about £15 10s. for the 80%.

CAUSTIC POTASH is unchanged.

POTASSIUM CHLORATE is still scarce and commands about 4¼d. per lb.

POTASSIUM PERMANGANATE is uninteresting.

POTASSIUM PRUSSIATE is rather quiet and is quoted at 7¼d. per lb.

SODIUM ACETATE is in rather poor demand. Is rather lower, at £17 10s. per ton.

SODIUM BICHROMATE.—Quiet but steady business is reported. English makers' price unchanged.

SODIUM PRUSSIATE is firmer and commands 4⅝d. per lb.

SODIUM NITRITE has been in fairly active inquiry. Price, £22 10s. per ton.

SODIUM SULPHIDE is unchanged.

ZINC SULPHATE is unchanged.

Coal Tar Products

Supplies of Coal Tar Products appear to be scarcer, owing to reduced production.

90% BENZOL is slightly weaker, and is quoted at 1s. 8d. to 1s. 8½d. per gallon on rails.

PURE BENZOL is steady at 1s. 11d. to 2s. per gallon on rails.

CREOSOTE OIL can be bought at 5⅜d. per gallon on rails in the North, and 7d. per gallon on rails in the South.

CRESYLIC ACID shows slightly more activity. The Pale quality 97/99% is quoted at 1s. 6d. to 1s. 6½d. per gallon, on rails, while the Dark quality 95/97% is in very little demand, and can be obtained at 1s. 1d. per gallon, on rails.

SOLVENT NAPHTHA is firmer at 1s. 5d. to 1s. 5½d. per gallon, on rails.

HEAVY NAPHTHA is quiet, and can be bought at 1s. 1d. to 1s. 2d. per gallon.

NAPHTHALENES.—The lower grades are weak, and are worth from £3 to £3 10s. per ton. There is slightly more activity in the higher grades, but prices still continue low, at £5 per ton for 74/76° quality, and £5 per ton for Whizzed or Hot Pressed, 76/78°.

PITCH remains dull and quiet. To-day's values are 37s. 6d. to 40s. f.o.b. main U.K. ports.

Latest Oil Prices

LONDON.—LINSEED OIL closed quieter at 2s. 6d. to 5s. advance. Spot, £41 10s.; September, £40 10s.; October-December, £40 12s. 6d.; January-April, £40 10s. RAPE OIL quiet. Crude crushed, spot, £49; technical refined, £52. COTTON OIL quiet. Refined common edible, £49; Egyptian, crude, £43 5s.; deodorised, £51. TURPENTINE firm and 3d. per cwt. higher. American, spot, 78s. 9d.; October-December, 79s. 6d., sellers; January-April, 81s. 6d., paid and sellers.

HULL.—LINSEED OIL.—Spot, £41; September to January-April, £40 15s. COTTON OIL.—Bombay crude, £38 15s.; Egyptian crude, £41; edible refined, £44 15s.; deodorised, £42 10s.; technical, £42 10s. PALM KERNEL OIL.—Crushed, naked, 5½ per cent., £42 10s. GROUND NUT OIL.—Crushed-extracted, £47; deodorized, £51. SOYA OIL.—Extracted and crushed, £42; deodorized, £45 10s. RAPE OIL.—Extracted, £48 per ton, net, cash terms, ex-mill.

Nitrogen Products Market

Export.—During the last week the demand for sulphate of ammonia has continued strong and sales have been made on the basis of £11 15s. per ton f.o.b. U.K. port. As the producers in other countries have also made good sales it is quite likely that the market will show a firmer tendency in the near future.

Home.—The home prices have been announced previously for delivery up to the end of November. During the last week or two there have been considerable home sales for Ireland and some of the large merchants here seem to be taking sulphate of ammonia into store in anticipation of a heavy home season. Home sales for the present year are about 10,000 tons in excess of last year.

Nitrate of Soda.—The nitrate market continues firm, and sales have been made, chief European ports, on the basis of £11/£11 5s. per ton. Large stocks of nitrate are in the hands of dealers. It seems, therefore, that the strong statistical position of the nitrate companies depends on the accuracy of the dealers' forecast of consumption requirements. However, on account of the firmer tendency for sulphate it does not appear likely that there will be any sagging in the nitrate market.

American Market Movements

(From *Drug and Chemical Markets*)

HEAVY chemicals remain firm at recent advances although a noticeable decline in buying is reported. Barium chloride lower on spot.

The market for fine chemicals remains quiet with few price changes. Some improvement is seen in buying with expectations of better business soon. Camphor is scarce and higher.

Benzene and other light oils easy with the exception of commercial xylene and solvent naphtha, which are higher. Pyridine lower from lack of demand. Intermediates remain unchanged in price although buying is slight. Vegetable oils unsettled. Linseed oil down. Cotton-seed oil declines further. Chinawood oil steady. Animal oils remain in a mixed state, some strong and others easy.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

Acid Acetic, 40% Tech.—£20 per ton.
Acid Boric, Commercial.—Crystal, £40 per ton, Powder, £42 per ton.
Acid Hydrochloric.—3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.
Acid Nitric, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.
Acid Sulphuric.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations: 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
Ammonia Alkali.—£6 15s. per ton f.o.r. Special terms for contracts.
Bleaching Powder.—Spot, £10 10s. d/d; Contract, £9 10s. d/d, 4 ton lots.
Bisulphite of Lime.—£7 10s. per ton, packages extra, returnable.
Borax, Commercial.—Crystal, £25 per ton. Powder, £26 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)
Calcium Chlorate (Solid).—£5 12s. 6d. to £5 17s. 6d. per ton d/d, carriage paid.
Copper Sulphate.—£25 to £25 10s. per ton.
Methylated Spirit 64 O.P.—Industrial, 2s. 5d. to 2s. 11d. per gall. Mineralised, 3s. 8d. to 4s. per gall., in each case according to quantity.
Nickel Sulphate.—£38 per ton d/d.
Nickel Ammonia Sulphate.—£38 per ton d/d.
Potash Caustic.—£30 to £33 per ton.
Potassium Bichromate.—5d. per lb.
Potassium Chlorate.—3½d. per lb., ex wharf, London, in cwt. kegs.
Salammoniac.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton. Carr. pd.
Salt Cake.—£3 15s. to £4 per ton d/d. In bulk.
Soda Caustic, Solid.—Spot lots delivered, £15 12s. 6d. to £18 per ton, according to strength; 20s. less for contracts.
Soda Crystals.—£5 to £5 5s. per ton ex railway depots or ports.
Sodium Acetate 97/98%.—£21 per ton.
Sodium Bicarbonate.—£10 10s. per ton, carr. paid.
Sodium Bichromate.—4d. per lb.
Sodium Bisulphite Powder 60/62%.—£17 per ton for home market, 1-cwt. iron drums included.
Sodium Chlorate.—3d. per lb.
Sodium Nitrate refined 96%.—£13 5s. to £13 10s. per ton, ex Liverpool.
Sodium Nitrite 100% basis.—£27 per ton d/d.
Sodium Phosphate, £14 per ton, f.o.r. London, casks free.
Sodium Sulphate (Glauber Salts).—£3 12s. 6d. per ton.
Sodium Sulphide conc. solid. 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. pd.
Sodium Sulphide Crystals.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. pd.
Sodium Sulphite, Pea Crystals.—£14 per ton f.o.r. London, 1-cwt. kegs included.

Coal Tar Products

Acid Carbolic Crystals.—5d. per lb. Slightly better demand. Crude 60's, 1s. 3d. to 1s. 4d. Market very weak; very few inquiries.
Acid Cresylic 97/99.—1s. 5d. to 1s. 6d. per gall. Steady, with more inquiry. Pale, 95%, 1s. 3d. to 1s. 5d. per gall. Dark, 1s. 3d. to 1s. 6d. per gall.
Anthracene Paste 40%.—3d. per unit per cwt.—Nominal price. No business.
Anthracene Oil, Strained.—7½d. per gall. Unstrained, 6½d. per gall.
Benzol.—Crude 65's.—11d. to 1s. 3d. per gall., ex works in tank wagons. Standard Motor, 1s. 8d. to 1s. 10d. per gall., ex works in tank wagons. Pure, 2s. 1½d. to 2s. 3d. per gall., ex works in tank wagons. Firm.
Toluol.—90%, 1s. 8d. to 1s. 9d. per gall. More inquiry. Pure, 1s. 11d. to 2s. per gall.
Xylol Commercial.—1s. 9½d. to 2s. 3d. per gall. Pure, 3s. 3d. per gall.
Creosote.—Cresylic, 20/24%, 8½d. per gall. Market very quiet. Standard specification, middle oil, heavy, 5½d. to 6½d. per gall. Steady demand.
Naphtha.—Solvent 90/160, 1s. 5d. to 1s. 6½d. per gall. Good inquiry. Solvent 90/190, 1s. to 1s. 4d. per gall. Fair demand.
Naphthalene Crude.—Drained Creosote Salts, £3 5s. to £3 10s. per ton. Market quiet. Whizzed or hot pressed, £5, but no demand.
Naphthalene.—Crystals and Flaked, £10 to £11 per ton, according to districts. Very quiet.
Pitch.—Medium soft, 35s. to 40s. per ton, according to district. Market flat.
Pyridine.—90/160, 19s. 6d. to 20s. per gall. Heavy, 11s. to 11s. 6d. per gall. Fair business.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated.

Acetic Anhydride 95%.—1s. 7d. per lb.
Acid Anthranilic 7s. per lb. 100%.
Acid Benzoic 1s. 9d. per lb.
Acid H.—3s. 6d. per lb. 100% basis d/d.
Acid Naphthionic.—2s. 2d. per lb. 100% basis d/d.
Acid Neville and Winther.—4s. 10d. per lb. 100% basis d/d.
Acid Sulphanilic.—9d. per lb. 100% basis d/d.
Aluminium Chloride, anhydrous.—10d. per lb. d/d.
Aniline Oil.—7d. to 7½d. per lb. naked at works.
Aniline Salts.—7d. to 8d. per lb. naked at works.
Antimony Pentachloride.—1s. per lb. d/d.
Benzaldehyde.—2s. 1½d. per lb. Good home inquiry.
Benzidine Base.—3s. 6d. per lb. 100% basis d/d.
Benzyl Chloride 95%.—1s. 1d. per lb.
p-Chlorphenol.—4s. 3d. per lb. d/d.
p-Chloraniline.—3s. per lb. 100% basis.
o-Cresol 29/31° C.—3d. per lb. Demand quiet.
m-Cresol 98/100%.—2s. 1d. per lb. Demand moderate.
p-Cresol 32/34° C.—2s. 1d. per lb. Demand moderate.
Dichloraniline.—2s. 3d. per lb.
Dichloraniline S. Acid.—2s. 3d. per lb. 100% basis.
Diethylaniline.—4s. 3d. per lb. d/d., packages extra, returnable.
Dimethylaniline.—2s. per lb. d/d. Drums extra.
Dinitrobenzene.—9d. per lb. naked at works.
Dinitrochlorbenzene.—£84 10s. per ton d/d.
Dinitrotoluene.—48/50° C. 8d. to 9d. per lb. naked at works. 66/68° C. 1s. per lb. naked at works.
Diphenylaniline.—2s. 10d. per lb. d/d.
G. Salt.—2s. 2d. per lb. 100% basis d/d.
a-Naphthol.—1s. 10d. per lb. d/d. Fair home inquiry.
B-Naphthol.—1s. per lb. d/d. Fair home inquiry.
a-Naphthylamine.—1s. 3d. per lb. d/d. Fair home inquiry.
B-Naphthylamine.—3s. 9d. per lb. d/d.
m-Nitraniline.—3s. 9d. per lb. d/d.
p-Nitraniline.—1s. 11d. per lb. d/d.
Nitrobenzene.—5¼d. to 5½d. per lb. naked at works. Good home inquiry.
o-Nitrochlorbenzol.—2s. 3d. per lb. 100% basis d/d.
Nitronaphthalene.—10d. per lb. d/d.
p-Nitrophenol.—1s. 9d. per lb. 100% basis d/d.
p-Nitro-*o*-amido-phenol.—4s. 6d. per lb. 100% basis.
m-Phenylene Diamine.—4s. per lb. d/d.
p-Phenylene Diamine.—9s. 9d. per lb. 100% basis d/d.
R. Salt.—2s. 4d. per lb. 100% basis d/d.
Sodium Naphthionate.—2s. 2d. per lb. 100% basis d/d.
o-Toluidine.—9d. per lb.
p-Toluidine.—2s. 3d. per lb. naked at works.
m-Toluylene Diamine.—4s. per lb. d/d.

Wood Distillation Products

Acetate of Lime.—Brown £9 10s. to £10. Quiet market. Grey, £15 per ton. Liquor, 9d. per gall. 32° Tw.
Acetone.—£73 per ton.
Charcoal.—£7 5s. to £8 10s. per ton, according to grade and locality.
Iron Liquor.—1s. 7d. per gall. 32° Tw. 1s. 2d. per gall, 24° Tw.
Red Liquor.—10d. to 1s. per gall. 14/15° Tw.
Wood Creosote.—2s. 9d. per gall. Unrefined.
Wood Naphtha, Miscible.—4s. 3d. per gall. 60% O.P. Solvent, 4s. 6d. per gall. 40% O.P.
Wood Tar.—£4 per ton.
Brown Sugar of Lead.—£43 per ton.

Rubber Chemicals

Antimony Sulphide.—Golden, 7½d. to 1s. 5d. per lb., according to quality, Crimson, 1s. 5d. to 1s. 7½d. per lb., according to quality.
Arsenic Sulphide, Yellow.—2s. per lb.
Barytes.—£3 10s. to £6 15s. per ton, according to quality.
Cadmium Sulphide.—4s. 4d. per lb.
Carbon Bisulphide.—£25 to £28 per ton, according to quantity.
Carbon Black.—5½d. per lb., ex wharf.
Carbon Tetrachloride.—£55 to £60 per ton, according to quantity, drums extra.
Chromium Oxide, Green.—1s. 3d. per lb.
Diphenylguanidine, 4s. to 4s. 3d. per lb.
Indiarubber Substitutes, White and Dark.—5¼d. to 6¾d. per lb.
Lamp Black.—£43 per ton, barrels free.
Lead Hyposulphite.—9d. per lb.
Lithopone, 30%.—£22 10s. per ton.
Mineral Rubber "Rubpron."—£13 12s. 6d. per ton f.o.r. London.
Sulphur.—£9 to £11 per ton, according to quality.

Sulphur Chloride.—4d. per lb., carboys extra.
Sulphur Precip. B.P.—£50 to £55 per ton.
Thiocarbamide.—2s. 6d. to 2s. 9d. per lb.
Thiocarbanilide.—2s. 1d. to 2s. 3d. per lb.
Vermilion, Pale or Deep.—5s. per lb.
Zinc Sulphide.—1s. 1d. per lb.

Pharmaceutical and Photographic Chemicals

Acid, Acetic, 80 % B.P.—£39 per ton ex wharf London in glass containers.
Acid, Acetyl Salicylic.—2s. 5d. to 2s. 9d. per lb. Keen competition continuing. Good demand.
Acid, Benzoic B.P.—2s. to 2s. 3d. per lb., according to quantity.
Acid, Boric B.P.—Crystal £46 per ton, Powder £50 per ton. Carriage paid any station in Great Britain.
Acid, Camphoric.—19s. to 21s. per lb.
Acid, Citric.—1s. 2½d. to 1s. 3d. per lb., less 5%. Weak.
Acid, Gallic.—2s. 9d. per lb. for pure crystal, in cwt. lots.
Acid, Pyrogallic, Crystals.—5s. 4d. to 5s. 6d. per lb.
Acid, Salicylic.—1s. 3½d. to 1s. 5d. per lb. Technical.—10½d. to 11d. per lb.
Acid, Tannic B.P.—2s. 8d. per lb.
Acid, Tartaric.—11d. to 11½d. per lb.
Amidol.—6s. 6d. per lb., d/d.
Acetanilide.—1s. 5d. per lb. for quantities.
Amidopyrin.—13s. 3d. per lb.
Ammonium Benzoate.—3s. 3d. to 3s. 6d. per lb., according to quantity.
Ammonium Carbonate B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks.
Atropine Sulphate.—11s. 6d. per oz. for English make.
Barbitone.—10s. 3d. to 10s. 6d. per lb. Lower owing to increased supplies.
Benzonaphthol.—3s. 6d. per lb. spot.
Bismuth Carbonate.—12s. 9d. to 14s. 9d. per lb.
Bismuth Citrate.—11s. 4d. to 13s. 4d. per lb.
Bismuth Salicylate.—10s. 2d. to 12s. 2d. per lb.
Bismuth Subnitrate.—10s. 9d. to 12s. 9d. per lb. according to quantity.
Prices advanced. Supplies of the metal much easier.
Borax B.P.—Crystal £29, Powder £30 per ton. Carriage paid any station in Great Britain.
Bromides.—Potassium, 1s. 10d. to 2s. 1d. per lb.; sodium, 2s. to 2s. 3d. per lb.; ammonium, 2s. 4d. to 2s. 7d. per lb., all spot. British or Imported. Firm.
Calcium Lactate.—1s. 3d. to 1s. 9d., according to quantity.
Chloral Hydrate.—3s. 5d. to 3s. 6d. per lb., duty paid.
Chloroform.—2s. 5½d. to 2s. 7½d. per lb., according to quantity.
Creosote Carbonate.—6s. 9d. per lb.
Formaldehyde.—£41 per ton, in barrels ex wharf.
Glycerophosphates.—Fair business passing. Calcium, soluble and citrate free, 7s. per lb.; iron, 8s. 9d. per lb.; magnesium, 9s. per lb.; potassium, 50%, 3s. 6d. per lb.; sodium, 60%, 2s. 6d. per lb.
Guaiacol Carbonate.—6s. to 7s. per lb.
Hexamine.—2s. 3d. powder crystal, 2s. 5d. free running crystal, per lb.
Homatropine Hydrobromide.—30s. per oz.
Hydrastine Hydrochloride.—English make offered at 120s. per oz.
Hydrogen Peroxide (12 vols.).—1s. 8d. per gallon f.o.r. makers' works, naked.
Hydroquinone.—4s. 4¾d. per lb., in cwt. lots.
Hypophosphites.—Calcium, 3s. 6d. per lb., for 28 lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
Iron Ammonium Citrate B.P.—1s. 8d. to 1s. 11d. per lb. Green, 2s. 2d. to 2s. 7d. per lb. U.S.P., 1s. 7d. to 1s. 10d. per lb.
Magnesium Carbonate.—Light Commercial, £34 per ton net. Light pure, £46 per ton.
Magnesium Oxide.—Light Commercial, £70 per ton, less 2½%, price reduced; Heavy Commercial, reduced to £24 per ton, less 2½%; Heavy Pure, 2s. to 2s. 3d. per lb., according to quantity.
Menthol.—A.B.R. recrystallised B.P., 42s. 6d. net per lb., October delivery. Synthetic, 22s. 6d. to 27s. 6d. per lb., according to quality. English make.
Mercurials.—Red oxide, 5s. 2d. to 5s. 4d. per lb.; Corrosive sublimate, 3s. 7d. to 3s. 9d. per lb; white precipitate, 4s. 6d. to 4s. 8d. per lb.; Calomel, 3s. 10d. to 4s. per lb. Still quiet.
Methyl Salicylate.—1s. 5d. to 1s. 8d. per lb. Demand increasing, price firmer.
Methyl Sulphonal.—16s. 9d. to 17s. per lb. Demand limited.
Metol.—9s. per lb. British make.
Paraformaldehyde.—1s. 9d. for B.P. quality.
Paraldehyde.—1s. 2d. to 1s. 3d. per lb., in free bottles and cases.
Phenacetin.—4s. to 4s. 3d. per lb.
Phenazone.—6s. to 6s. 3d. per lb. Spot lower than forward price.
Phenolphthalein.—4s. to 4s. 3d. per lb. Supply exceeds demand.
Potassium Bitartrate 99/100% (Cream of Tartar).—78s. per cwt., less 2½% for ton lots.
Potassium Citrate.—1s. 7d. to 1s. 10d. per lb.
Potassium Ferricyanide.—1s. 9d. per lb. Quiet.
Potassium Iodide.—16s. 8d. to 17s. 5d. per lb., according to quantity. Steady market.
Potassium Metabisulphite.—7½d. per lb., 1-cwt. kegs included, f.o.r. London.
Potassium Permanganate.—B.P. crystals, 7¾d. per lb., spot. Firmer.
Quinine Sulphate.—2s. 3d. to 2s. 4d. per oz., in 100 oz. tins. Steady market.
Resorcin.—3s. 10½d. per lb. In fair quantities.
Saccharin.—63s. per lb. in 50 lb. lots.
Salol.—3s. 3d. to 3s. 6d. per lb.
Silver Proteinate.—12s. per lb. for satisfactory product light in colour.
Sodium Benzoate, B.P.—1s. 10d. to 2s. 2d. per lb.
Sodium Citrate, B.P.C., 1911.—1s. 4d. to 1s. 7d. per lb., B.P.C., 1923. 1s. 7d. to 1s. 8d. per lb., according to quantity. U.S.P., 1s. 7d. to 1s. 10d. per lb.
Sodium Hyposulphite, Photographic.—£14 to £15 per ton, according to quantity, d/d consignee's station in 1-cwt. kegs.
Sodium Metabisulphite Crystals.—37s. 6d. to 60s. per cwt., net cash, according to quantity.
Sodium Nitroprusside.—16s. per lb.
Sodium Potassium Tartrate (Rochelle Salt).—75s. per cwt., for ton lots and upwards.
Sodium Salicylate.—Powder, 1s. 10d. to 2s. per lb. Crystal 1s. 11d. to 2s. 1d. per lb. Flake, 2s. 1d. to 2s. 4d. per lb. Prices cut fine: keen competition.
Sodium Sulphide, pure recrystallised.—10d. to 1s. 2d. per lb.
Sodium Sulphite, anhydrous, £27 10s. to £28 10s. per ton, according to quantity; 1-cwt. kegs included.
Sulphonal.—12s. 3d. to 12s. 6d. per lb. Limited demand.
Thymol.—12s. 6d. to 15s. per lb.

Perfumery Chemicals

Acetophenone.—9s. per lb.
Aubepine (ex Anethol).—10s. per lb.
Amyl Acetate.—3s. per lb.
Amyl Butyrate.—6s. 6d. per lb.
Amyl Salicylate.—3s. 1½d. per lb.
Anethol (M.P. 21/22° C.).—5s. 9d. per lb.
Benzyl Acetate from Chlorine-free Benzyl Alcohol.—2s. 4d. per lb.
Benzyl Alcohol free from Chlorine.—2s. 4d. per lb.
Benzaldehyde free from Chlorine.—2s. 9d. per lb.
Benzyl Benzoate.—2s. 9d. per lb.
Cinnamic Aldehyde Natural —15s. 6d. per lb.
Coumarin.—13s. per lb.
Citronellol.—19s. per lb.
Citral.—10s. per lb.
Ethyl Cinnamate.—9s. per lb.
Ethyl Phthalate.—3s. per lb.
Eugenol.—9s. 6d. per lb.
Geraniol (Palmarosa).—27s. per lb.
Geraniol.—8s. to 16s. per lb.
Heliotropine.—6s. 3d. per lb.
Iso Eugenol.—14s. 6d. per lb.
Linalol ex Bois de Rose.—19s. 6d. per lb.
Linalyl Acetate.—18s. 6d. per lb.
Methyl Anthranilate.—9s. 3d. per lb.
Methyl Benzoate.—5s. per lb.
Musk Ketone.—30s. per lb.
Musk Xylol.—7s. 9d. per lb.
Nerolin.—4s. per lb.
Phenyl Ethyl Acetate.—14s. per lb.
Phenyl Ethyl Alcohol.—12s. per lb.
Rhodinol.—36s. 6d. per lb.
Safrol.—1s. 8d. per lb.
Terpineol.—1s. 8d. per lb.
Vanillin.—23s. 9d. per lb.

Essential Oils

Almond Oil.—12s. 6d. per lb.
Anise Oil.—3s. 6d. per lb.
Bergamot Oil.—24s. 6d. per lb. 28s. asked for forward shipment.
Bourbon Geranium Oil.—16s. per lb.
Camphor Oil.—60s. per cwt.
Cananga Oil, Java.—11s. 3d. per lb.
Cinnamon Oil, Leaf.—5d. per oz.
Cassia Oil, 80/85%.—9s. 9d. per lb.
Citronella Oil.—Java, 85/90%, 3s. 7d.; Ceylon, 2s. 3d. per lb.
Clove Oil.—7s. 6d. per lb.
Eucalyptus Oil, 70/75%.—1s. 10d. per lb.
Lavender Oil.—French 38/40% Esters, 27s. 6d. per lb. Market advancing,
Lemon Oil.—6s. 9d. per lb. 7s. asked for forward shipment.
Lemongrass Oil.—4s. 9d. per lb.
Orange Oil, Sweet.—10s. 9d. per lb.
Otto of Rose Oil.—Bulgarian, 60s. per oz. Anatolian, 35s. per oz.
Palma Rosa Oil.—13s. 9d. per lb.
Palma Rose Oil.—15s. 3d. per lb.
Peppermint Oil.—Wayne County. No good quality material available. Japanese, 26s. per lb. Much firmer.
Petitgrain Oil.—9d. per lb.
Sandal Wood Oil.—Mysore, 26s. per lb. Australian, 18s. 6d. per lb.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, September 18, 1925.

THE heavy chemical market has been moderately active during the past week and export inquiry has been better. Prices remain at about the same level as last reported.

Industrial Chemicals

ACID ACETIC.—In moderate request and price unchanged. 98/100%, glacial, £56 to £67 per ton, according to quality and packing, c.i.f. U.K. ports. 80% pure, £40 to £42 per ton. 80% technical, £39 to £41 per ton, packed in casks, c.i.f. U.K. ports.

ACID BORIC.—Crystal, granulated or small flaked, £40 per ton. Powdered, £42 per ton, packed in bags, carriage paid U.K. stations.

ACID CARBOLIC, ICE CRYSTALS.—Still in good demand and price unchanged at about 5d. to 5½d. per lb. delivered or f.o.b. U.K. ports.

ACID CITRIC, B.P. CRYSTALS.—Rather cheaper at about 1s. 3⅜d. per lb., less 5%, ex store. Offered for prompt shipment at 1s. 3½d. per lb., less 5%, ex wharf.

ACID FORMIC, 85%.—Spot material quoted £48 10s. per ton, ex store. On offer from the continent at about £47 per ton c.i.f. U.K. ports.

ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy, ex works.

ACID NITRIC, 80°.—Quoted £23 5s., ex station, full truck loads.

ACID OXALIC, 98/100%.—Spot material quoted 3½d. per lb., ex store, offered for prompt shipment from the continent at about 3⅜d. per lb., ex wharf.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality, 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—In good demand and price slightly higher at 11⅝d. per lb., less 5%, ex store. Offered for forward delivery at 11½d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE, 17/18%, IRON FREE.—Quoted £6 15s. per ton, ex store, spot delivery. Offered for prompt shipment from the continent at £6 5s. per ton, c.i.f. U.K. ports.

ALUM, LUMP POTASH.—Spot material unchanged at £9 5s. per ton, ex store. Offered for early shipment from the continent at about £8 per ton, c.i.f. U.K. ports.

AMMONIA ANHYDROUS.—Moderate demand and price unchanged at 1s. 4½d. per lb., less 5%, ex station. Containers extra and returnable.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton, packed in 5 cwt. casks, delivered U.K. ports.

AMMONIA LIQUID, 880°.—In steady demand. Unchanged at 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers crystals quoted £28 per ton, ex station. Offered from the continent at about £24 per ton, c.i.f. U.K. ports. Fine white crystals quoted £19 10s. per ton, c.i.f. U.K. ports.

ARSENIC, REFINED WHITE CORNISH.—In very poor demand. Spot lots now quoted £24 per ton, ex store. Offered for early delivery at about £23 5s. per ton, ex wharf.

BARIUM CHLORIDE.—Large crystals quoted £9 10s. per ton, ex store. On offer at £8 5s. per ton, c.i.f. U.K. ports to come forward. Fine white crystals quoted about £7 5s. per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—Spot lots, English material, £10 10s. per ton, ex station. Contracts 20s. per ton less. On offer from the continent at about £8 7s. 6d. per ton, c.i.f. U.K. ports.

BARYTES.—English material unchanged at £5 5s. per ton, ex works. Continental quoted £5 per ton, c.i.f. U.K. ports.

BORAX.—Granulated, £24 10s. per ton. Crystals, £25 per ton. Powdered, £26 per ton. Carriage paid U.K. stations, minimum ton lots.

CALCIUM CHLORIDE.—English manufacturers' prices unchanged at £5 12s. 6d. to £5 17s. 6d. per ton, carriage paid U.K. stations. Continental on offer at £4 2s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Now quoted £3 7s. 6d. per ton, f.o.r. or f.o.b. U.K. ports, packed in casks.

COPPER SULPHATE.—Spot material available at about £23 10s. per ton, ex wharf. English for export quoted £24 10s. per ton, f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Quoted £40 per ton, ex store, spot delivery. Offered for prompt shipment at about £39 5s. per ton, c.i.f. U.K. ports.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental quoted £2 17s. 6d. per ton, c.i.f. U.K. ports.

LEAD, RED.—Quoted £43 per ton, c.i.f. U.K. ports. Early delivery. Spot material available at about £44 per ton, ex store.

LEAD, WHITE.—Now quoted £44 10s. per ton, ex store. Spot delivery.

LEAD ACETATE.—White crystals, spot material, now quoted £45 per ton, ex store. Brown about £43 per ton, ex store. White crystals on offer from the Continent at £43 15s. per ton, c.i.f. U.K. ports. Brown about £38 10s. per ton, c.i.f. U.K. ports.

MAGNESITE, GROUND CALCINED.—In moderate demand, and price unchanged at about £8 15s. per ton, ex station.

POTASH CAUSTIC.—88/92%.—Quoted £27 10s. per ton, c.i.f. U.K. ports. Limited quantities of spot material available at about £30 per ton, ex store.

POTASSIUM BICHROMATE.—Price for home consumption, 5d. per lb., delivered.

POTASSIUM CARBONATE.—Offered for prompt shipment from the Continent at £26 per ton, c.i.f. U.K. ports. Spot material quoted £27 per ton, ex store.

POTASSIUM CHLORATE, 99/100%.—Quoted £32 per ton, c.i.f. U.K. ports. Offered for October delivery at slightly less.

POTASSIUM NITRATE, SALTPETRE, 99%.—Refined granulated quoted at about £24 10s. per ton, c.i.f. U.K. ports. Spot material quoted £27 per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Spot material quoted 8d. per lb., ex store. Offered for early delivery at 7⅜d. per lb., ex wharf.

POTASSIUM PRUSSIATE, YELLOW.—Spot lots quoted 7½d. per lb., ex store. Offered for early delivery from the Continent at a fraction less.

SODA CAUSTIC, 76/77%.—£18 per ton; 70/72%, £16 12s. 6d. per ton; broken, 60%, £17 2s. 6d. per ton; powdered, 98/99%, £21 7s. 6d. per ton. All carriage paid U.K. stations. Spot delivery. Contracts 20s. per ton less.

SODIUM ACETATE.—Quoted £18 15s. per ton, ex store. Spot delivery. On offer from the Continent at about £17 15s. per ton c.i.f. U.K. ports.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station. M.W. quality, 30s. per ton less.

SODIUM CARBONATE. — Soda crystals, £5 to £5 5s. per ton, ex quay or station; powdered or pea quality, £1 7s. 6d. per ton more; alkali, 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—English material unchanged at £9 10s. per ton, ex station, minimum 4 ton lots. Pea crytsals, £14 per ton, ex station. Continental quoted £9 10s. per ton, ex store.

SODIUM NITRATE.—Quoted £13 per ton, ex store; 96/98%, refined quality, 7s. 6d. per ton extra.

SODIUM NITRITE, 100%.—Quoted £24 per ton, ex store. Offered from the Continent about £22 5s. per ton, c.i.f. U.K. ports.

SODIUM PRUSSIATE, YELLOW.—Spot lots quoted 4¼d. to 4½d. per lb., ex store. Offered for forward delivery at about 4⅛d. per lb., ex wharf.

SODIUM SULPHATE, SALTCAKE.—Price for home consumption £3 10s. per ton, f.o.r. works. Good inquiry for export and higher prices obtainable.

SODIUM SULPHIDE.—English material. Solid, 60/62%, now £13 per ton. Broken, £14 per ton. Flake, £15 per ton. Crystals, £8 10s. per ton. Carriage paid U.K. stations; minimum 4 ton lots, with slight reductions for contracts to the end of the year; 60/62%, solid, offered from the Continent at £10 15s. per ton, c.i.f. U.K. ports. Broken, £1 per ton more; 30/32%, crystals, £7 15s. per ton, c.i.f. U.K. ports.

SULPHUR.—Flowers, £10 10s.; roll, £9 10s.; rock, £9 7s. 6d.; ground, £9 10s. per ton, ex store. Spot delivery. Prices nominal.

ZINC CHLORIDE, 98/100%.—Quoted from the Continent at £24 5s. per ton, c.i.f. U.K. ports; 97/98%, of English manufacture, on offer at £25 per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Fine white crystals quoted £12 10s. per ton, c.i.f. U.K. ports.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

BETA NAPHTHOL.—1s. per lb. Some home inquiries.

ALPHA NAPHTHYLAMINE.—1s. 3d. per lb. Some home inquiries.

PARANITRANILINE.—1s. 11d. per lb. Some home inquiries.

Chemical Engineering Transactions

VOLUME II. of the Transactions of the Institution of Chemical Engineers for 1924 is similar in character to its predecessor, and contains a record of the papers read during the year and the usual proceedings. It is a useful publication for filing for the members' use, though its size may not be the most convenient for the private library shelf.

Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, September 17, 1925.

Although the prices of chemical products on the Manchester market are keeping up fairly well on the whole, there are one or two lines where a distinctly easy tendency is to be observed. From the point of view of actual business done no improvement can yet be reported. The demand generally is for the bread-and-butter lines, and for these values keep up well to recent levels. Most of the current inquiries are for spot or early delivery, though in some few instances buyers are placing orders for small parcels for forward.

Heavy Chemicals

Acetate of soda is exciting little interest and is easy at round £18 per ton. Caustic soda continues to meet with a moderate demand at steady prices, ranging from £15 12s. 6d. for 60 per cent. material to £18 per ton for 76–77 per cent. Hyposulphite of soda is not much changed from last week at £14 10s. to £15 per ton for photographic crystals and about £9 5s. for commercial quality, but business in both cases is on a quiet scale. Soda crystals are steady at £5 5s. per ton, and a fair inquiry is being met with. Saltcake is still a very slow seller and values are weak, from £3 10s. to £3 12s. 6d. per ton being quoted. Glauber salts are also quiet and easy at about £3 10s. per ton. Bleaching powder is selling only in relatively small quantities though quotably unchanged at about £9 10s. per ton. Bicarbonate of soda is steady but in quiet demand at £10 10s. per ton. Prussiate of soda keeps firm at round 4d. per lb. and a moderate amount of business is being put through. Phosphate of soda is still an easy section of the market at £12 to £12 10s. per ton and supplies are not much sought after. Sulphide of sodium is inactive at round £12 per ton for 60–65 per cent. concentrated solid and £9 5s. for commercial material. Alkali is selling in fair quantities, and prices are maintained at about £6 15s. per ton. Chlorate of soda is quiet at 2¾d. to 3d. per lb.

Among potash compounds values are maintained pretty well all round. Chlorate of potash is steady and in moderate request at 4d. per lb. Caustic potash is in quiet demand at £29 to £29 10s. per ton. Carbonate of potash is firm and in fair inquiry at round £25 10s. per ton for 96–98 per cent. material. Bichromate of potash is still quoted at about 5d. per lb., but the demand for this material is on a limited scale. Permanganate of potash is quoted at 7¾d. to 8d. per lb. for pharmaceutical quality and about 6d. for commercial; demand, however, is on rather quiet lines.

No improvement in the position of arsenic has yet made its appearance and quotations continue very weak; white powdered, Cornish makes, is on offer at about £19 per ton on rails and round £22 in Manchester. Sulphate of copper still attracts little attention, though prices are about unchanged from last week at £24 to £24 10s. per ton. Nitrate of lead is quiet but steady at £41 to £42 per ton. Acetate of lead is also held at recent rates; white is quoted at about £45 and brown at £40 to £41 per ton. Acetate of lime is quoted at £14 10s. per ton for grey and £7 10s. for brown, but the demand is rather restricted. Epsom salts are quiet at about £3 15s. per ton for commercial, with magnesium sulphate, pharmaceutical quality, on offer at £5 5s.

Acids and Coal Tar Products

Neither in tartaric nor citric acid is there much business being done, and values are less steady than they have been for some weeks past. Tartaric acid is offering at 11½d. and citric at 1s. 3¼d. per lb. Oxalic acid continues dull and inactive though quotably unchanged at 3⅜d. per lb. Acetic acid is maintained at about £38 per ton for 80 per cent. commercial and £66 to £67 for glacial.

Little actual business is passing in pitch, and price is nominal at about 40s. per ton. Solvent naphtha is quiet and easy at 1s. 5d. per gallon. Creosote oil is still quoted at 5⅝d. to 6d. per gallon, but the demand for this material is slow. Carbolic acid is in small request at 4⅞d. per lb. for crystal and 1s. 4d. per gallon for crude. Naphthalene is weak and in limited demand; refined is quoted at about £13 per ton and crude material from £4.

Chemistry at the Northern Polytechnic

The Northern Polytechnic recommences the day and evening courses for the session 1925-26 on Monday, September 21.

Instruction, suitable for candidates for the Honours degrees of the University of London, is provided in Chemistry, Physics, Mathematics, Botany, and Geology, whilst unique facilities are afforded to those interested in Rubber Technology. A complete rubber plant has been installed, and the courses are suitable for the diploma examinations for the Associateship (A.I.R.I.) and Fellowship (F.I.R.I.) of the Institution of the Rubber Industry. To provide for the requirements of those who are not directly engaged in rubber manufacture, but are associated with the industry, for example, as salesmen, a broad outline of the rubber manufacturing operations is given in a short course, including lectures and practical work which extends over a period of twelve weeks. Research work receives special encouragement both in pure and applied science. Full particulars may be obtained from the Secretary, Northern Polytechnic, Holloway, N.7.

Liverpool Chemists' Reconstruction Scheme

A reconstruction scheme has been formulated by Evans, Sons, Lescher and Webb, Ltd., the Liverpool chemists. It is proposed that the capital of the new company shall be £450,000. Holders of each 5 per cent. cumulative preference share will be entitled to two new 6 per cent. shares of 6s. 8d. each, credited with 5s. per share paid, and can take up one new ordinary 6s. 8d. share at par. Holders of each ordinary share will receive one new share, on which an assessment of 2s. 8d. will be made, and are also given the right to subscribe for new ordinary shares at par, share for share. The company had a debit balance of £417,087 at the end of 1924, and the debt to the bank involved interest charges of £23,000 in 1924. If the scheme goes through the company hopes to clear off the debenture debt. The directors state that the business is making good progress. Trading profit for 1924 amounted to £20,065, which showed an improvement of £39,046 over the 1923 total.

Calcium Chlorate Wanted for China

A Hongkong firm of importers and exporters writes :—

"We have received an inquiry for calcium chlorate, and, knowing that you are well informed as to sources of supply, we write you these lines requesting to be put in touch with some suppliers of this chemical. We should like to receive samples and c.i.f. quotations. Our clients intend to buy about 500 tons a year and possibly more. In the event of business resulting, we shall be prepared to open a letter of credit to cover our purchase enabling the shipper to draw on us 90 d/s draft upon presenting shipping document to a bank. For information concerning our standing, we refer you to the Hongkong and Shanghai Bank, or P. & O. Bank of Hongkong."

Porcelain or Glass-lined Vessels Required

An iron and steel merchant in South Wales writes: "I shall be obliged if you could kindly give me the names of manufacturers of porcelain or glass-lined vessels. I have handled a fair quantity of secondhand plant of this description from Government factories, and this has included some boiling pans about 3 ft. dia. and 2 ft. 6 in. deep, lined with a glassy material about $\frac{1}{16}$ in. thick. The pans were of cast iron, about ⅝ in. thick. I have been unable to find the makers of these, and as I now require some similar new plant, I would be grateful for any information you can give me. I think that either steel or cast iron vessels would suit my clients in this case."

Chemical Exhibits at the Leipzig Fair

The Leipzig Technical Fair, which ended last week, was not a success so far as the chemical exhibits were concerned, according to a report in the current issue of *Chemiker-Zeitung*. Although several industrial operations were exhibited on a small scale, such as the making of perfumes, dyes, varnishes, and stains, the scientific institutions were poorly represented, and the industrial concerns which have made practical use of scientific research, such as leading dyestuff firms, oil and lubricant works, and the iron trade appear to have missed their opportunity to make an adequate display of their products.

Company News

LAFARGE ALUMINOUS CEMENT CO.—It is proposed to pay the dividend on the first preference shares for the year ended March 31 and to carry forward the remaining £159.

SIAMESE TIN SYNDICATE.—A third interim dividend of 10 per cent. (2s. per share), less tax, at 4s. 1½d. in the £1, has been declared, in respect of the current year, payable on September 30.

UNITED ALKALI CO.—The directors have declared an interim dividend of 4 per cent., less tax, on the ordinary shares in respect of the year ending December 31, 1925. This compares with 5 per cent. paid last year.

ENGLISH MARGARINE WORKS, LTD.—The directors announce a dividend of 7 per cent. on the cumulative participating preference share in respect of the twelve months ended December 21, 1932, less tax at 4s. 1½d. in the £, payable on September 29.

SAN PATRICIO NITRATE CO., LTD.—At an extraordinary general meeting held on September 10, the resolution passed at the extraordinary general meeting on August 25, for the sale of the undertaking and assets to the Santa Rita Nitrate Co., Ltd., was confirmed.

ELLIOTT'S METAL CO.—The net profits for the year ended August 1 were £74,145, after providing for debenture interest, and £41,000 was brought forward. A final dividend of 1s. per share is proposed on the ordinary shares, making 2s. per share (10 per cent.) for the twelve months, adding £10,000 to the reserve (making that fund £50,000) and carrying forward £49,586.

BURT, BOULTON AND HAYWOOD, LTD.—The report for the year ended June 30 states that the nêt profits, after writing off £15,000 to depreciation, and £5,121 off the expenses of debenture stock issue, amount to £61,012, to which has to be added £17,241 brought forward. The directors recommend a final dividend of 5 per cent., less tax, on the ordinary shares, making 10 per cent. for the year, a final distribution on the workers' certificates of £357. The sum of £15,000 is carried to reserve and £14,420 is carried forward.

Tariff Changes

BELGIAN CONGO.—The exportation of gum copal is now free from restriction.

GERMANY.—New taxes, to come into force as from October 1, include—salt, 3 reichmarks per 100 kilogrammes net; starch sugar, 8·40 reichmarks per 100 kilogrammes; other sugar, 21 reichmarks per 100 kilogrammes.

GREECE.—The export of olive oil has been prohibited.

AUSTRALIA.—Extensive revisions in the Tariff are proposed. Full schedules of proposed alterations are printed in *The Board of Trade Journal* for September 10.

Chemical Trade Inquiries

The following inquiries, abstracted from the " Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

COPPERAS.—For supply of about 500 tons of good commercial copperas or other soluble iron compound for use as a precipitant of sewage, for Salford Corporation. Price to include delivery of 100 tons a month at the sewage disposal works, Weaste (own siding). Samples to be submitted for analysis. Tenders, addressed " Chairman River Irwell Conservancy Committee, Town Hall, Salford," and endorsed " Copperas," must be delivered by September 23.

FILTER MEDIA.—For removal of about 400 tons of media from filters and refilling same with new media, at their Littlewood sewage works at Cheslyn Hay, for Cannock Council. Particulars from Mr. H. M. Whitehead, engineer, Penkridge, Stafford.

PORTLAND CEMENT.—For supply of Portland cement for six months from October 1, for Portsmouth Corporation Cement must conform to requirements of the current British standard specification for Portland cement. Forms of tender from the Borough Engineer's Office, Town Hall, to be delivered to Mr. F. J. Sparks, town clerk, by September 18.

CENTRIFUGAL MACHINES.—An agent at Berlin-Charlottenburg desires to represent British manufacturers of centrifugal machines, especially those used in the regenerating of oils, benzene, fats, etc. Correspondence in English. (Reference No. 323.)

Ceramic Society

Annual Meeting of Refractory Materials Section

THE Refractory Materials Section of the Ceramic Society held its annual meeting on Wednesday and Thursday at the rooms of the Chemical Society, London, when Mr. Frank West (president) was in the chair.

A paper on the infleunce of foreign matter on the thermal expansion and transformation of silica was presented by Messrs. J. L. F. Wood, H. S. Houldsworth, and Professor J. W. Cobb. Experiments were tried with Welsh quartzite, and it was found that few of the materials added had produced any effect on the degree of conversion of the quartz, and even in the most favourable mixtures the acceleration of the inversion of the quartz was extremely small. Dr. J. W. Mellor and Mr. P. J. Leather took part in a discussion.

Mr. C. E. Moore, in a paper on " Low Temperature Burning of Stourbridge Fireclay," gave results of experiments on the co-efficient of expansion of fired clay, on the dehydration of clays on heating, and the purification of clay by suspension in water, and it was claimed the effects observed were in complete accord with the hexite-pentite theory of the Drs. Asch.

Other papers presented were " Pottery Refractories," by Mr. W. Emery, and " The Storage of Silica Refractories," by Mr. W. J. Rees (Sheffield University). His conclusion was that, although high-quality bricks were more resistant to deterioration from exposure to weather, some deterioration would take place on prolonged exposure to weather. It was obviously desirable to protect bricks during storage and to take precautions to avoid wetting in transit.

Election of Officers

A general meeting was held on Wednesday afternoon for the purpose of electing officers and members of Council to fill vacancies caused by retirement.

Mr. Frank West continues to hold office as President. There are three Vice-Presidents and three representatives of each of the various districts. The following were elected to fill existing vacancies :—Vice-President, Mr. H. J. C. Johnston. Representatives: Yorkshire, Mr. E. F. Illingworth and Mr. Joseph Morton; Stourbridge, Mr. Allen; Lancs, North Wales, Cheshire, and Derbyshire, Mr. P. Hammond; Sheffield and Lincolnshire, Mr. F. Russell; South Wales, Mr. W. R. Jones; Scottish, Mr. W. Boyd Mitchell.

The suggestion that the spring meeting next year be held in Czecho-Slovakia was not adopted owing to the fact that several big meetings were to be held in that country at that time and lack of hotel accommodation was anticipated. It was hoped to hold the spring meeting there in 1927. An invitation to hold next year's spring meeting in Cornwall was accepted.

Libraries in Industry

AT the annual conference of the Libraries Association at Birmingham on Tuesday, Mr. A. F. Ridley, librarian to the British Non-Ferrous Metals Research Association and hon. secretary of the Association of Special Libraries and Information Bureau, read a paper on special libraries. He outlined the necessity for, and the great benefits of, special libraries and information bureaux in connection with specific industries. They assisted in the carrying out of research and overcoming of problems. Dr. D. F. Twiss, chief chemist to the Dunlop Rubber Co., said that it was very desirable that in connection with every general library in an industrial centre there should be built up a special or technical library.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the " Registry of County Court Judgments " does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

KERSHAW, Joe, Eccleshill Dye Works, Old Mill, Eccleshill, Bradford, wool dyer. (C.C., 19/9/25.) £11 10s. 10d., August 6, and £37 5s., August 7.

MARSHALL AND CO., 78, King Street, Kingsland, E., manufacturing chemists. (C.C., 19/9/25.) £17 2s. 6d. August 15.

Deeds of Arrangement

BOOTH, Thomas, Arthur, Louisa Street, and 16, the Grove, Idle, Bradford, wholesale manufacturing druggist. (D.A., 19/9/25.) Filed September 12. Trustee, F. Gill, 2A, Tyrrel Street, Bradford, C.A. Secured creditors, £1,160; liabilities unsecured, £3,591; assets, less secured claims, £3,965.

RADCLIFFE, Harry Clement, 4, Brookfield Road, Higher Crumpsall, chemist, and ROBERTSHAW, George Frederick, 36, Eaton Road, Chester, chemist, trading at 105, Hulme Hall Lane, Miles Platting, as IMPERIAL CHEMICAL CO., dyestuffs manufacturers. [D.A., 19/9/25). Filed September 11. Trustee, H. S. Johnson, 3, Tib Lane, Manchester, accountant. Secured creditors, £17; liabilities unsecured, £1,772; assets, less secured claims, £659.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

CRITCHLEY BROS. (DYERS), LTD., Manchester. (M., 19/9/25.) Registered September 7, £500 debenture dated August 28, 1924, to R. Dobson and another, Mosley Street, Manchester; general charge. *£10,000. September 3, 1925.

DUCKHAM (ALEXANDER) AND CO., LTD., London, E.C., manufacturers of petroleum products. (M., 19/9/25.) Registered September 2, £50,000 debentures (filed under Sec. 93 (3) of the Companies (Consolidation) Act, 1908), present issue, £5,000; general charge. *£8,000. June 3, 1925.

KEELINGS OXIDES (1921), LTD., London, S.W. (M., 19/9/25.) Registered September 8, £200 and £1,100 debentures, part of £50,000 and bonus of 5 per cent.; general charge. *£30,000. February 2, 1924.

Satisfaction

OSMOS SALTS, LTD., Teddington. (M.S., 19/9/25.) Satisfaction registered September 5, all money, etc., registered November 14, 1924.

Receivership

MAYPOLE CO. (1899), LTD. (R., 19/9/25.) F. W. Stephens, of 26, Salisbury House, London Wall, E.C., was appointed receiver by Order of Court, dated July 27, 1925. (Notice filed September 4.)

London Gazette, &c.

Company Winding Up Voluntarily

SAN PATRICIO NITRATE CO., LTD. (C.W.U.V., 19/9/25.) By special resolution, August 25, confirmed September 10, W. J. Welch appointed liquidator. Meeting of creditors, Baltic House, 27, Leadenhall Street, London, E.C.3, on Monday, September 28, at 12.30 p.m.

Partnership Dissolved

ALKALINE PRODUCTS CO. (Ronald Henderson WADDELL and William Henry BOWYER), manufacturers of chemical products, 68–70, Newington Causeway, S.E.1, by mutual consent as from July 13, 1925. Debts received paid by W. H. Bowyer, who continues the business.

New Companies Registered

CASTLEFORD FLINT GLASS BOTTLE CO., LTD. Glass bottle manufacturers, etc. Nominal capital, £5,000 in £1 shares. Solicitors: A. Butler, Strand Buildings, Castleford.

CELLULOSE PRODUCTS, LTD., 24, Coleman Street, London. Chemical manufacturers, analytical, consulting and pharmaceutical chemists, druggists, distillers of essential and synthetic oils, drysalters, etc. Nominal capital, £18,900 in 18,000 7 per cent. cumulative preference shares of £1 and 18,000 ordinary shares of 1s.

FIELD AND PALMER, LTD. Drysalters, tar paviors, damp course and roofing material manufacturers, tar distillers, paint manufacturers, etc. Nominal capital, £600 in £1 shares. Solicitor: A. E. Burton, 10, Norfolk Street, Strand, London.

FURMOTO CHEMICAL CO., LTD., 169, Camberwell Road, London, S.E.5. Manufacturing chemists. Nominal capital, £2,500 in £1 shares.

GOODWIN-TIDSWELL, LTD., 47, Carnarvon Street, Cheetham, Manchester. Manufacturing chemists and essence distillers, druggists, drysalters, oil and colourmen, etc. Nominal capital, £100 in £1 shares.

GREEN AND BAXTER, LTD. Manufacturers of and dealers in feeding stuffs, fertilisers, guano, manures, glue, soap, dealers in oil and the products thereof, etc. Nominal capital, £3,000. Solicitors: Buckle and Sons, 49, Priestgate, Peterborough.

SULPHUR BLACKS, LTD. Dyers, bleachers and finishers, manufacturers, importers and exporters of dyes, dye extracts, etc. Nominal capital, £1,000 in £1 shares. Solicitor: T. A. Farrell, Alderley, Davyhulme, Lancs.

TOTAL FIRE EXTINGUISHER CO., LTD., British Columbia House, 1-3, Regent Street, London. Manufacturers of and dealers in all fire extinguishing apparatus, etc. Nominal capital, £1,000 in 900 8 per cent. preference shares of £1 and 2,000 ordinary shares of 1s. each.

THE BRITISH ENKA ARTIFICIAL SILK CO., LTD.—Formed by the Maekubee Co., of Holland, which holds all the foreign rights of the Enka Artificial Silk Co. of Holland. Capital, £1,000,000, divided into £250,000 of 6 per cent. debenture and £750,000 of ordinary shares. The board will include Sir Henry Strakosch, George Harold Winterbottom, James Carmichael.

Road Surfacing Materials

In a recent report, the Committee of the Royal Scottish Automobile Club state that they have been in communication with the Ministry of Transport and numerous road authorities and officials on the subject of road surfaces. The Committee had gone into the whole matter very fully and had come to the conclusion that the principal cause of the road surfaces being wet with tar was inadequacy in the amount of top dressing. The matter of the material used had also had considerable bearing on the case. Roads top dressed with bitumen, the report stated, had little tendency to " bleed," unlike roads dressed with tar and pitch. Tar and pitch softened at a temperature of 60° F., and at 70° they became quite liquid. Bitumen, on the other hand, was not much affected until the temperature was very much higher, and did not become liquid until the temperature approached 130° F. There was a strong inducement to use the cheaper material, but the Committee hoped that the experience during the heat wave would warrant road authorities in concluding that economy, in either the material used or the quantity of chippings employed, was misplaced and should be avoided.